SPECIAL ARTICLE / *ARTIGO ESPECIAL*

High discrepancies in the mortality of hospitalized patients with COVID-19 in the two most economically important states in Brazil

Alta discrepância na mortalidade de pacientes hospitalizados por COVID-19 nos dois estados economicamente mais importantes do Brasil

Vitor Barreto Paravidino[I,II] [ID], Rosely Sichieri[I] [ID], Danilo Cosme Klein Gomes[I] [ID], Gulnar Azevedo e Silva[I] [ID]

ABSTRACT: *Objective:* The aim of this study was to compare the proportion of deaths among hospitalized cases of COVID-19 in São Paulo and Rio de Janeiro, stratified by private and public services. *Methods:* Hospitalization data for severe acute respiratory syndrome (SARS) were obtained using the SIVEP-Gripe Database. All hospitalized adults who were diagnosed as COVID-19 or unspecified SARS, between January and December 2020, were included in the analysis. Logistic regression models were fitted to evaluate the risk of death between Rio de Janeiro and São Paulo, adjusted for age, sex, and comorbidities. *Results:* A total of 388,657 hospital registers for Rio de Janeiro and São Paulo (91,532 and 297,125, respectively) were analyzed. Missing data are frequent in the database and it was greater in Rio de Janeiro, at the state and capital levels. Adjusting for confounders, the odds ratio of dying by COVID-19, comparing the state of Rio de Janeiro with São Paulo, was 2.51 in the private hospitals and 2.29 in the public ones. For the capitals, the scenario is worse. The lethality among hospitalized patients with COVID-19 is at least twice in Rio de Janeiro than São Paulo, both at the states and capitals. The public or private services showed important differences, with odds ratios of 2.74 and 3.46, respectively. *Conclusion:* It appears that the worst governance in the health sector in Rio de Janeiro, more than lack of resources, explains the excess mortality of hospitalized COVID-19 patients in Rio de Janeiro.

Keywords: COVID-19. Hospital mortality. Delivery of health care. Brazil.

[I]Department of Epidemiology, Institute of Social Medicine, Universidade do Estado do Rio de Janeiro – Rio de Janeiro (RJ), Brazil.
[II]Department of Physical Education and Sports, Naval School, Marinha do Brasil – Rio de Janeiro (RJ), Brazil.
Corresponding author: Vitor Barreto Paravidino. Rua São Francisco Xavier, 524, Bloco E, 7º andar, Maracanã, CEP: 20550-013, Rio de Janeiro (RJ), Brazil. E-mail: vparavidino@gmail.com

RESUMO: *Objetivo*: Comparar a proporção de óbitos entre os casos de COVID-19 hospitalizados em São Paulo e Rio de Janeiro, estratificados por serviços públicos e privados. *Métodos*: Os dados de hospitalização por Síndrome Respiratória Aguda Grave (SRAG) foram obtidos do banco de dados SIVEP-Gripe. Todos os adultos hospitalizados com diagnóstico de COVID-19 ou SRAG não especificado, entre janeiro e dezembro de 2020, foram incluídos na análise. Modelos de regressão logística foram usados para avaliar o risco de morte entre Rio de Janeiro e São Paulo, ajustados para idade, sexo e comorbidades. *Resultados*: Foram analisados 388.657 registros hospitalares do Rio de Janeiro e de São Paulo (91.532 e 297.125, respectivamente). Os dados faltantes no banco são frequentes e maiores no Rio de Janeiro (estado e capital). Ajustando para fatores de confusão, a razão de chance de morrer por COVID-19, comparando o estado do Rio de Janeiro com o de São Paulo, foi de 2,51 nos hospitais privados e de 2,29 nos públicos. Para as capitais, o cenário é pior. A letalidade entre pacientes internados com COVID-19 no Rio de Janeiro é pelo menos o dobro da de São Paulo, tanto para os estados quanto para as capitais. Os serviços públicos ou privados apresentaram diferenças importantes, com razão de chance de 2,74 e 3,46, respetivamente. *Conclusão:* Parece que a pior governança do setor da saúde no Rio de Janeiro, mais do que a falta de recursos, explica o excesso de mortalidade de pacientes internados com COVID-19 no Rio de Janeiro.

Palavras-chave: COVID-19. Mortalidade hospitalar. Atenção à saúde. Brasil.

INTRODUCTION

At the end of June 2021, more than 504,000 deaths of COVID-19 have been reported in Brazil and the number is increasing at a fast rate. At this point, the state of Rio de Janeiro has the second highest COVID-19 mortality rate (329/100,000 inhabitants) in Brazil[1]. Rio de Janeiro is the second largest economy in the country, second only to São Paulo, which makes the high mortality rates observed in the state, in comparison to other states, inexplicable.

Although the proportion of the elderly population is higher in Rio de Janeiro than São Paulo (18.9 and 13.3%, respectively), after age standardization, the rates indicate that other factors, besides age, may influence the disparities in the risk of death (195/100,000 inhabitants in Rio de Janeiro versus 125/100,000 in the capital of São Paulo)[2].

The overall number of reported cases of COVID-19 by June 2021 in the state of São Paulo is five times the number notified by the state of Rio de Janeiro, whereas the respective population is 2.6 times greater (approximately 44 million vs. 17 million inhabitants). Therefore, comparing the two states and their capitals in relation to the characteristics and evolution of hospitalized patients and deaths by COVID-19 may clarify the high mortality rates observed in the state of Rio de Janeiro.

This study aims to compare the proportion of deaths among hospitalized cases of COVID-19 in São Paulo and Rio de Janeiro states and capitals, stratified by private and public services.

METHODS

Hospitalization data for severe acute respiratory syndrome (SARS) were obtained using the SIVEP-Gripe Database, available and freely accessible at https://dados.gov.br/dataset/bd-srag-2020, and no approval by the ethics committee is required. To classify the service as public or private, we used the CNES Database, available at http://tabnet.fiocruz.br/dash/menu_dash.htm.

All hospitalized adults (age ≥18 years) who were diagnosed for COVID-19 or unspecified SARS, between January 1, 2020, and December 31, 2020, were included in the analysis. Cases of SARS for other causes (e.g., influenza, another respiratory virus, and another etiologic agent) as well as Down syndrome, pregnant or postpartum women were excluded.

Age, sex, race, schooling, and comorbidities history data (e.g., obesity, diabetes mellitus, cardiovascular disease, neurological disease, and kidney disease) were also collected.

DATA ANALYSIS

For descriptive analysis, absolute and percentage values for patient's characteristics were presented. The risk of death between Rio de Janeiro and São Paulo was estimated using logistic regression models adjusted for age, sex, and comorbidities. The analyses were performed for the state and capital levels. Missing information for all comorbidities was assumed as a lack of morbidity. Two sensitivity analyses were performed: one to evaluate possible differences in the rate of the notification process, by removing November and December data from analysis, and the other one to evaluate the impact of outcome missing data, assuming all missing as a cure.

RESULTS

The number of registers from Rio de Janeiro and São Paulo included in the analyses was 388,657 (91,532 and 297,125, respectively). The SIVEP-GRIPE Surveillance System has many variables beyond the diagnostic. However, except for age with no missing, and sex with very few missing, the other variables (race, years of education, and comorbidities) show large percentages of nonresponse. In addition, the quality of data shows greater disparities. Thus, missing information on race was 13% in the public service of the interior of São Paulo and 54% in the private sector of the capital of Rio de Janeiro. Race information was always worst in the private service compared to that in the public service. For schooling, there was almost 80% of missingness for all comparisons, except for the public and private services in the interior of São Paulo, which, despite being high, it is around 50% (Table 1).

The classification of the type of service (public or private) has also unidentified ones with a greater percentage in Rio (capital and interior) than São Paulo, with values around 22% in Rio and 14% in São Paulo, for both private and public services. Missingness for all variables is greater in Rio than São Paulo.

The crude death rate (Table 2) of hospitalized patients with COVID-19 was greater in the state of Rio de Janeiro than São Paulo, for all age group and in both private and public hospitals. In Table 2, the crude risk of mortality in the age group 18–40 years, comparing Rio with São Paulo, was 2.9 in the private hospitals and 2.1 in the public ones. These values for the age group 90 years or above were 1.6 and 1.4, respectively.

Table 1. Characteristics of individuals notified with COVID-19 or unspecified severe acute respiratory syndrome in Rio de Janeiro and São Paulo states from January 1, 2020, to December 31, 2020.

	Rio de janeiro (n=91,532)				São Paulo (n=297,125)			
	Capital* (n=49,798)		Other cities† (n=41,734)		Capital‡ (n=120,159)		Other cities§ (n=176,966)	
	Private (n=19,481)	Public (n=19,187)	Private (n=11,084)	Public (n=21,243)	Private (n=38,860)	Public (n=63,685)	Private (n=37,182)	Public (n=114,378)
Age (years)								
18–40	1,776 (9.12)	1,877 (9.78)	1,603 (14.46)	2,221 (10.37)	7,863 (20.23)	8,184 (12.85)	5,942 (15.98)	13,568 (11.86)
41–60	5,356 (27.49)	5,318 (27.72)	3,825 (34.51)	6,468 (30.19)	13,340 (34.33)	20,349 (31.95)	13,165 (35.41)	35,068 (30.66)
+60	12,349 (63.39)	11,992 (62.50)	5,656 (51.03)	12,734 (59.44)	17,657 (45.44)	35,152 (55.19)	18,075 (48.62)	65,742 (57.48)
Sex								
Male	10,788 (55.38)	10,281 (53.58)	5,916 (53.37)	11,719 (54.70)	20,888 (53.75)	35,266 (55.38)	20,749 (55.80)	63,245 (55.29)
Female	8,693 (44.62)	8,906 (46.42)	5,167 (46.62)	9,699 (45.27)	17,972 (46.25)	28,419 (44.62)	16,425 (44.17)	51,123 (44.70)
Missing	0.00	0.00	1 (0.01)	5 (0.02)	0.00	0.00	8 (0.02)	10 (0.01)
Race								
White	5,407 (27.76)	4,383 (22.84)	4,097 (36.96)	7,533 (35.16)	15,350 (39.50)	27,677 (43.46)	23,328 (62.74)	69,879 (61.09)
Black	772 (3.96)	1,499 (7.81)	507 (4.57)	2,039 (9.52)	910 (2.34)	4,433 (6.96)	1,320 (3.55)	6,208 (5.43)
LSB*	2,609 (13.39)	8,270 (43.10)	2,126 (19.18)	5,928 (27.67)	4,069 (10.47)	16,921 (26.57)	4,455 (11.98)	21,978 (19.22)
Others	121 (0.62)	89 (0.47)	65 (0.59)	144 (0.67)	775 (2.00)	958 (1.51)	471 (1.27)	1,039 (0.90)
Missing	10,572 (54.27)	4,946 (25.78)	4,289 (38.70)	5,779 (26.98)	17,756 (45.69)	13,696 (21.51)	7,608 (20.46)	15,274 (13.35)

Missing data for the variable type of service (private/public): *11,130 (22.4%); †9,227 (22.1%); ‡17,614 (14.7%); §25,406 (14.4%). LSB = Light-skinned black

For all ages, the overall adjusted odds ratio is provided in Table 3. The same pattern observed in the crude rates is observed for age- and sex-adjusted analysis. Models, further adjusted for all comorbidities reported, had an odds ratio of 2.51, comparing the state of

Table 2. Crude hospital COVID-19 mortality in Rio de Janeiro and São Paulo states by private and public services, according to age groups.

Age groups (years)	Rio de Janeiro				São Paulo			
	Private		Public		Private		Public	
	n	%	n	%	n	%	n	%
18–40	228	9.35	764	22.72	423	3.23	2,187	10.69
41–60	1,171	17.70	3,439	34.92	1,969	7.81	9,972	19.06
61–80	3,597	42.93	8,569	54.58	5,229	23.80	25,382	36.55
80–90	2,266	59.51	2,989	68.10	3,403	39.18	9,940	47.94
+90	993	70.88	870	74.23	1,504	44.96	3,123	54.09

Table 3. Adjusted odds ratio for COVID-19 mortality, comparing the states and capitals of Rio de Janeiro and São Paulo, by type of service.

State	OR	95%CI	Private		Public	
			OR	95%CI	OR	95%CI
Model 1						
São Paulo	1.00	–	1.00	–	1.00	–
Rio de Janeiro	2.28	2.24–2.32	2.47	2.39–2.56	2.21	2.16–2.26
Model 2						
São Paulo	1.00	–	1.00	–	1.00	–
Rio de Janeiro	2.35	2.31–2.39	2.51	2.42–2.61	2.29	2.23–2.35
Capital	OR	95%CI	Private		Public	
			OR	95%CI	OR	95%CI
Model 1						
São Paulo	1.00	–	1.00	–	1.00	–
Rio de Janeiro	2.93	2.86–3.01	3.39	3.23–3.56	2.66	2.57–2.76
Model 2						
São Paulo	1.00	–	1.00	–	1.00	–
Rio de Janeiro	3.01	2.94–3.09	3.46	3.29–3.63	2.74	2.64–2.84

Model 1 adjusted for age and sex. Model 2 adjusted for age, sex, obesity, diabetes, cardiovascular disease, neurological disease, and kidney disease.

Rio de Janeiro with São Paulo in the private hospitals, and 2.29 in the public ones. For the capitals, the scenario is worse, with Rio de Janeiro presenting the triple of the risk of São Paulo and the public or private services showing important differences, with odds ratios of 2.74 and 3.46, respectively. In both Rio de Janeiro and São Paulo, mortality rates in public hospitals are approximately twice as high as in the private sector (Table 4).

Two sensitivity analyses (Table 5) were performed, one excluding the last 2 months of notification, to account for the slowness of data management in Rio de Janeiro, and another one, which is expected to be a more conservative analysis, considering all missing cases for the variable evolution as non-cases, shown in both scenarios, the same pattern of great disparities in mortality in Rio.

One possible explanation for the Rio/São Paulo disparity in mortality would be differences in available beds for COVID-19. Concerning hospital beds (per 100,000 population), São Paulo shows a better scenario than Rio de Janeiro (27.8 and 23.3, respectively)[3]. However, in the period evaluated, the lag in time between diagnostic and hospitalization was similar for both Rio and São Paulo (i.e., 5.8 and 5.9 days, respectively).

Table 4. Adjusted odds ratio for COVID-19 mortality in Rio de Janeiro and São Paulo, comparing public and private services.

Type of service	State				Capital			
	Rio de Janeiro		São Paulo		Rio de Janeiro		São Paulo	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Private	1.00		1.00		1.00		1.00	
Public	1.84	1.77–1.91	1.95	1.91–2.00	1.90	2.20–2.40	2.37	2.28–2.45

Model adjusted for age, sex, obesity, diabetes, cardiovascular disease, neurological disease, and kidney disease.

Table 5. Adjusted odds ratio for COVID-19 mortality, comparing the capitals of Rio de Janeiro and São Paulo capital, according to the type of service.

State	OR	95%CI	Private		Public	
			OR	95%CI	OR	95%CI
Model 1						
São Paulo	1.00		1.00		1.00	
Rio de Janeiro	2.96	2.87–3.04	3.21	3.04–3.39	2.80	2.68–2.92
Model 2						
São Paulo	1.00		1.00		1.00	
Rio de Janeiro	2.12	2.07–2.17	2.19	2.09–2.29	2.17	2.10–2.25

Model 1 adjusted for age, sex, obesity, diabetes, cardiovascular disease, neurological disease, and kidney disease, excluding the notification of the last 2 months (November and December) of 2020. Model 2 adjusted for age, sex, obesity, diabetes, cardiovascular disease, neurological disease, and kidney disease, considering the missing data for the outcome (evolution) as a cure.

DISCUSSION

Our findings of greater lethality for COVID-19 among hospitalized patients in Rio de Janeiro than São Paulo, both at the capital and interior of the states, are in line with findings of mortality for 100,000 inhabitants of the Epidemiological Monitor of the Ministry of Health[1]. Also, a recent study using data from the SIVEP-Gripe from March 2020 to January 2021 drew attention to the fact of the age-standardized mortality by COVID-19 was 56% higher in Rio de Janeiro than São Paulo[2]. In this study, the authors showed that the SIVEP-Gripe is a reliable source of mortality by COVID-19 and that the specific mortality coefficients by all age groups are higher in Rio de Janeiro than those in São Paulo.

In our analysis, removing the last 2 months of 2020 and including in the denominator all missing information for case definition allowed us to explore whether the quality of data could explain the discrepancy in mortality between the two cities; however, the discrepancy remained high, despite these procedures.

Having twice the chance of death from COVID-19 by being hospitalized in Rio de Janeiro than in São Paulo is unacceptable since Rio is the second economy in the country[4] and has almost many UTI beds in public hospitals.

São Paulo has more hospital beds per inhabitant, as well as greater primary health care coverage than Rio (62.9% and 58.9%, respectively) in 2020[5]; however, these differences are not sufficient to explain the discrepancy in hospitalized patients with COVID-19. Greater disorganization of the health system in Rio de Janeiro than São Paulo is an ongoing process. In July 2019, the Regional Labor Court of the First Region in Rio de Janeiro determined the seizure of R$ 38 million of accounts to the municipality of Rio de Janeiro to pay compensation to 1,500 health agents dismissed by the Institute of Basic and Advanced Health Care (IABAS, acronym in Portuguese, Instituto de Atenção Básica e Avançada à Saúde)[6]. This same institution was involved in the disastrous administration of the field hospitals during the pandemic and, as is well known, corruption in the health department of Rio de Janeiro culminated in the arrest of the state health secretary.

São Paulo occupies the second position in monthly household income per capita and Rio de Janeiro the fourth position, with a monthly income of R$ 1,814 and R$ 1,723, respectively. The proportion of the population over 16 years of age employed in the first quarter of 2021 was 67.1% in the state of São Paulo and 63.6% in Rio de Janeiro[7]. Thus, economic differences exist, but they are small to explain the large differences in mortality. Also, the proportion of the population registered in the Cadastro Único, available to families with monthly income lower or equal to ½ minimum wage was 12.2% in the city of São Paulo compared to 8.9% in the city of Rio de Janeiro[8]. With the exception that the records do not portray the total vulnerability of families, it appears that São Paulo is not less vulnerable than Rio de Janeiro. The vulnerability has been shown to affect COVID-19 mortality. In Belo Horizonte, a metropolitan city also in the Southeast of Brazil, the overall mortality per 100,000 older adults (60+ years) was 292, increasing from 179 to 354 and 476, in low, intermediate, and high vulnerability areas, respectively[9].

These various aspects show that there is not much plausible explanation for the differences in mortality from COVID-19 comparing Rio de Janeiro and São Paulo, and the COVID-19 crisis revigorated an old principle of Public Health, which says that political power to implement measures is one of the cornerstones of success. São Paulo–Rio de Janeiro discrepancy can in part be explained by the Brazilian intense political conflicts. The national government is negationist, never planned a pandemic response, never articulated municipalities, states, and federal government to face and to prepare in advance for the pandemic. Both municipality and state-level government in Rio de Janeiro, until the beginning of 2021, were in line with the federal government and followed, in many ways, the lack of preparedness to deal with the pandemic. The governor's impeachment aggravated the situation and may be responsible for the observed excess mortality. In contrast, the São Paulo municipality together with the state-level government planned the actions to expedite the opening of hospital beds and hospital care, although preventive measures have fallen short of what is necessary for both Rio de Janeiro and São Paulo.

The conflicts in the management of the pandemic between the national government and state- and local-level governments were dependent on their political affiliations, which partially may explain the death discrepancies by COVID-19 in the two most developed states.

In contrast, the greater risk of dying of COVID-19 in public hospitals than private ones indicates the need for better-equipped public services. According to Paim[10], chronic underfunding of Brazil's Unified Health System (SUS) is one of the major problems. The Federal Government reduced its share of 63.8% of public spending on health in 1995 to about 42% in 2017. In 1994, the Federal Government created the Emergency Social Fund, which promoted, in 2016, the removal of 30% of the Social Security Budget for other expenses. Also, the Constitutional Amendment Nº 95 implemented in 2016 established a spending ceiling for the Federal Government and froze public resources for health for 20 years[11,12].

Although initiatives were taken to improve financing (Provisional Contribution on Financial Transactions, EC29/2000 and the Health +10 Movement), the percentage of gross domestic product (GDP) allocated for SUS remained below that of private spending. In 2017, Brazil spent 9.2% of GDP on health, with 3.9% (42%) public spending and 5.4% (58%) private spending[11].

Thus, SUS has difficulties in maintaining its service network and remunerating its workers, limiting the needed expansion of the public infrastructure. Paim concludes "a passive boycott prevails due to public underfunding, and an active boycott gains momentum when the state rewards, recognizes and privileges the private sector through subsidies, deregulation, and sub-regulation"[10].

In addition to the SUS underfunding, the COVID-19 epidemic increased the costs of health services. The cost associated with the average length of stay in hospital for COVID-19 treatment had the highest mean total amount spent in the South region of Brazil than the other ones, but in Rio de Janeiro the cost was almost half of the South region mean and Rio de Janeiro had also higher lethality rate[13].

The COVID-19 epidemic found Brazilian public institutions in difficulty due to the fiscal austerity measures and the strong restriction. SUS lost almost 22.5 billion reais between 2018 and 2020[14], and the transfer of specific federal financial resources to states and municipalities was not well managed in Rio de Janeiro, as already pointed out.

Therefore, reduction of discrepancies in the public/private findings requires resources for improvements in governance, hiring, and better training of health teams, as well as purchasing equipment and adapting services. Public/private discrepancies may also be due to greater morbidity in the public services clientele, a factor that was not fully accounted for in the analysis by the morbidities included. It is well known the greater prevalence of less healthy lifestyle habits in these patients of lower socioeconomic level. As an example, food consumption data in Brazil are worse in the lowest incomes[15].

In conclusion, it appears that the worst governance in the health sector in Rio de Janeiro, more than lack of resources, explains the excess mortality of hospitalized COVID-19 patients in Rio de Janeiro.

REFERENCES

1. Coronavírus Brasil. Painel coronavírus [Internet]. 2021 [cited on 07 Jul. 2021]. Available at: https://covid.saude.gov.br.

2. Azevedo e Silva G, Jardim BC, Lotufo PA. Mortalidade por COVID-19 padronizada por idade nas capitais das diferentes regiões do Brasil. Cad Saúde Pública 2021; 37(6): e00039221. https://doi.org/10.1590/0102-311X00039221

3. GOVE. Plataforma para decisão para eficiência de governos. Relação de leitos por mil habitantes – recorte regional [Internet]. 2021 [cited on 07 Jul. 2021]. Available at: https://www.gove.digital/wp-content/uploads/2020/03/Leitos.pdf.

4. Instituto Brasileiro de Geografia e Estatística. Produto Interno Bruto – PIB [Internet]. 2021 [cited on 07 Jul. 2021]. Available at: https://www.ibge.gov.br/explica/pib.php

5. Brasil. Ministério da Saúde. Secretaria de Atenção Primária à Saúde. Departamento de Saúde da Família. Unidades Geográficas: Brasil [Internet]. 2021 [cited on 15 Jul. 2021]. Available at: https://egestorab.saude.gov.br/paginas/acessoPublico/relatorios/relHistoricoCoberturaAB.xhtml

6. Consultor Jurídico. Demissão em massa. TRT-1 bloqueia R$ 38 milhões do Rio para pagar indenização a agentes de saúde. Revista Consultor Jurídico, 18 de julho de 2019. [Internet]. 2019 [cited on 15 Jul. 2021]. Available at: https://www.conjur.com.br/2019-jul-18/trt-bloqueia-38-milhoes-rio-pagar-agentes-saude.

7. Instituto Brasileiro de Geografia e Estatística. IBGE cidades [Internet]. 2020 [cited on 16 Jul. 2021]. Available at: https://cidades.ibge.gov.br/brasil/sp/panorama.

8. Brasil. Ministério da Cidadania. Secretaria de Avaliação e Gestão da Informação. Relatórios de Informações Sociais. RI Bolsa Família e Cadastro Único [Internet]. [cited on 16 Jul. 2021]. Available at: https://aplicacoes.mds.gov.br/sagi/RIv3/geral/index.php?relatorio=153&file=entrada.

9. Passos VMA, Brant LCC, Pinheiro PC, Correa PRL, Machado IE, Santos MR, et al. Higher mortality during the COVID-19 pandemic in socially vulnerable areas in Belo Horizonte: implications for vaccine prioritization. Rev Bras Epidemiol 2021; 24: e210025. http://doi.org/10.1590/1980-549720210025

10. Paim JS. Thirty years of the Unified Health System (SUS). Cien Saude Colet 2018; 23(6): 1723-8. http://doi.org/10.1590/1413-81232018236.09172018

11. Associação Brasileira de Saúde Coletiva. Fortalecer o SUS, em defesa da democracia e da vida. Rio de Janeiro: Abrasco; 2020. Available at: https://www.abrasco.org.br/site/wp-content/uploads/2020/10/Abrasco_Fortalecer-o-SUS.pdf

12. Souza LEPF, Paim JS, Teixeira CF, Bahia L, Guimarães R, Almeida-Filho N, et al. The current challenges of the fight for a universal right to health in Brazil. Cien Saude Colet 2019; 24(8): 2783-92. http://doi.org/10.1590/1413-81232018248.34462018

9

13. Santos HLPC, Maciel FBM, Santos Junior GM, Martins PC, Prado NMBL. Public expenditure on hospitalizations for COVID-19 treatment in 2020, in Brazil. Rev Saude Publica 2021; 55: 52. http://doi.org/10.11606/s1518-8787.2021055003666

14. Menezes APR, Moretti B, Reis AAC. O futuro do SUS: impactos das reformas neoliberais na saúde pública – austeridade versus universalidade. Saúde Debate 2019; 43(especial 5): 58-70. http://doi.org/10.1590/0103-11042019s505

15. Pesquisa de orçamentos familiares 2017-2018: análise da segurança alimentar no Brasil. Pesquisa de orçamentos familiares 2017-2018. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística; 2020. Available at: https://biblioteca.ibge.gov.br/visualizacao/livros/liv101749.pdf