Analysis of the implementation of the Hospital Component in the Emergency Care Network

Análise da implantação do Componente Hospitalar na Rede de Atenção às Urgências e Emergências

Marilei Elisangela Radel[1], Helena Eri Shimizu[1]

DOI: 10.1590/0103-11042023136021

ABSTRACT This study aims to describe the implementation of the Hospital Component of the Urgent and Emergency Care Network (RUE), and to evaluate the delivery of priority Lines of Care in places that serve as gateways in Brazilian regions, between 2011 and 2019. This is a descriptive and analytical study, using data from the National Registration System of Health Institutions (CNES) of the Ministry of Health. To assess significant differences before and after the implementation of Priority Lines of Care, the Wilcoxon test was used. It was found that the Southeast region had the largest increase, including the implementation of technologically denser care points, followed by the Northeast, South, North, and Midwest regions. The South region stood out for the implementation of Priority Lines of Care. Not only did it implement the most of these lines, but it also increased the number of visits and decreased the average length of stay. The Trauma Line of Care was found to be the most effective, when verifying the number of visits with population growth. It was concluded that the Hospital Component of the RUE has made considerable advance, but regional inequalities are still significant.

KEYWORDS Delivery of health care. Emergency service, hospital. Emergencies. Critical care.

RESUMO *Objetivou-se descrever a implantação dos serviços do Componente Hospitalar da Rede de Atenção às Urgências e Emergências (RUE) e avaliar a efetividade das Linhas de Cuidado prioritárias nos estabelecimentos habilitados como Portas de Entrada, nas regiões/Unidade da Federação do Brasil, entre 2011 e 2019. Estudo descritivo e analítico, cujos dados foram obtidos do Cadastro Nacional de Estabelecimentos de Saúde (CNES) e do Ministério da Saúde, para avaliar diferenças significativas, antes e depois, da implantação das Linhas de Cuidado prioritárias por meio do teste de Wilcoxon. Constatou-se que a região Sudeste foi a que mais evoluiu, inclusive na implantação de pontos de atenção mais densos tecnologicamente, seguida das regiões: Nordeste, Sul, Norte e Centro-Oeste. A região Sul se destacou na implantação das Linhas de Cuidado prioritárias; além de ter abarcado maior número de implantações dessa Linha, também foi a que melhor evidenciou o crescimento no número de atendimentos e a diminuição no Tempo Médio de Permanência. Verificou-se que a Linha de Cuidado do Trauma foi a que apresentou maior efetividade ao se verificar o número de atendimentos com o crescimento populacional. Concluiu-se que o Componente Hospitalar da RUE teve considerável avanço, contudo, as desigualdades regionais são ainda expressivas.*

PALAVRAS-CHAVE *Atenção à saúde. Serviço hospitalar de emergência. Emergências. Cuidados críticos.*

[1] Universidade de Brasília (UnB) – Brasília (DF), Brasil.
radelmatos@gmail.com

Introduction

The creation and implementation of public policies that promote the pursuit of basic principles such as intergrality is understood to be an important means of achieving quality in health services[1].

It is a fact that there are still inequalities in the distribution of the Hospital Component in different regions, including technical ones, which makes it difficult for the population to access health services[2,3].

In urgent cases and emergencies, this need is even more pronounced because the situations involved depend on a quick and timely response. Moreover, interruptions of comprehensive care in the face of imminent danger to life become more apparent[4].

Episodic and reactive medical operation significantly impairs the functioning of the system. Against this background, the establishment of networks is considered an important tool for the effectiveness of the most important guarantee of the individual: the right to health[1,4].

The need to overcome a fragmented health care system that emphasizes curative rather than preventive measures led the Ministry of Health in 2010 to create the Health Care Network (in portuguese Rede de Atenção à Saúde – RAS), understood as a network that integrates the different care centers in a given area and is organized in such a way that these centers, even if they have different levels and technological densities, are interconnected and suitable for serving users[5,6].

The RAS is divided into Thematic Networks that have been built and implemented over the years to respond to specific health conditions. These networks work in a complete cycle that also includes comprehensive care (including its continuity) at different levels (primary, secondary and tertiary)[5,6].

The Urgencies and Emergencies Care Network (in Portuguese Rede de Atenção às Urgências e Emergências – RUE) is one of these Thematic Networks. It was established by Decree GM/MS No. 1.600 of July 7, 2011[7] and later inserted in the Consolidation Decrees GM/MS No. 3 and No. 6, both of September 28, 2017[8,9]. It consists of several components, including the Hospital Component, which was regulated by Decree GM /MS No. 2.395 of October 11, 2011[10].

Also according to the regulation GM/MS nº 2.395/2011[10] (which is also included in the consolidation regulations GM/MS nº 3 and nº 6, both dated 28 September, 2017)[8,9], the hospital component of the RUE is a service with qualified personnel organized by extending the service of the hospital emergency gateways, clinical reserve stations, long-term care beds, priority Lines of Care (LC), and intensive care beds, with the aim of providing comprehensive and qualified care to patients in urgent and emergency situations. The service's guidelines include[10,11]: universality, equity, and integrality in emergency care; humanization of care, focusing on comprehensive care of the user; prioritized care through risk classification by degree of suffering, urgency, and severity of the case; regionalization of emergency care with connection of the different points of care and regulated access to health services; and multidisciplinary care, established through clinical care practices and based on LC management[10,11].

These guidelines are intended to qualify the service for spontaneous demand or referrals from other less complex care centers and to provide support for the admission of moderate to high complexity patients by providing diagnostic procedures, clinical support beds, long-term care beds, and emergency department beds, and Intensive Care Unit (ICU) beds, which strengthens hospital care in the focus areas of trauma, cardiovascular, and cerebrovascular care[10]. These focus areas, structured, aligned, and articulated, would provide comprehensive

care. However, despite the emphasis on regionalization since the inception of the Unified Health System (SUS), there are still inequalities in the distribution of these points of care[11].

Therefore, knowing the current status of a policy is essential to analyze the evolution of its implementation. A study that shows where the smaller and larger numbers are, and those with greater or lesser technological capacity, as well as the functioning of the priority LCs, can serve as a basis for managers to make decisions on adjustments/adaptations and redesigns of this network.

To date, the studies about the Hospital Component of the RUE don't address the evolutionary panorama at the national level. This deficiency is due to the fact that this is a relatively new policy, and its regulations on the individual points of care weren't created until later[12].

With this in mind, this study aims to describe the implementation of the services of the Hospital Component of RUE and evaluate the effectiveness of the priority LC in the facilities qualified as gateways in the regions/states of Brazil from 2011 to 2019.

For this purpose, the following definitions are given for the care units that are part of the Hospital Component of the RUE:

Hospital Gateways

This is the grouping of services installed in a hospital unit to provide uninterrupted care for the spectrum of spontaneous and referred requirements of clinical, pediatric, surgical and/or trauma, obstetric, and mental health emergencies[10].

Back-up beds

One of the strategies to improve hospital care is to expand and qualify beds[10]. Back-up beds can be created or qualified in strategic hospitals or in smaller hospitals, but they must support emergency rooms and emergency care centers and be available only as support for emergency care.

Priority Lines of Care

LCs are a way to articulate resources and health production among care units in a given health region, with the goal of flexible, timely, and unique delivery of diagnoses and treatments that respond to epidemiologic needs of greater relevance. The Hospital Component of the RUE establishes that a priority CL has primary responsibility for cardiovascular, cerebrovascular, and trauma care[11].

Inpatient Long-term Care Units and Specialized Long-Care Hospitals

Inpatient Long-term Care Units (LCUs) and Long-term Care Hospitals (LCHs) are intermediate facilities between acute hospital care and primary care. Long-term care also includes the necessary home support before the user returns home[11].

Care for critical patients: Intensive Care Units

ICUs are environments equipped with state-of-the-art technology, where emergency situations are imminent and where agility and ability in care are constantly required. They're places where patients in critical condition receive specialized care. For patients admitted there, strict control of their vital signs and continuous and intensive care are required[13].

Material and methods

This is a descriptive and analytical study of the implementation of the Hospital Component of the RUE, based on the qualifications established between the respective state and municipal managers under the bipartite Intermanagerial Commission (CIB) and published by the Ministry of Health for the period

between 2011 and 2019. This period is justified by the start of the implementation of the Hospital Component (with the publication of Decree No. 2,395/2011) and the year immediately preceding the establishment of the current situation of the Public Health Emergency of International Importance (ESPIIN), making the system more targeted in 2020 and 2021 to address issues related to COVID-19.

Data were extracted from control tables (in Excel® files) obtained from the General Coordination of Urgency (Coordenação-Geral de Urgência – CGURG) of the Division of Hospital, Home, and Emergency Care of the Secretariat of Specialized Health Care of the Ministry of Health, to which access was requested through the Access to Information Act (Lei de Acesso à Informação – LAI), demand 40343237, NUP/SEI nº 25072.00899/2021-61- and the National Registry of Health Facilities (Cadastro Nacional de Estabelecimentos de Saúde –CNES).

It was expected that the number of assistances would increase after the implementation of LCs, because from then on these services would receive not only unplanned requests, but also requests referred by the Regulation Center, as indicated in the 'Instructional Manual of the Urgency and Emergency Care Network in the Unified Health System (SUS)'[11], and that average length of stay (LOS) would decrease because it is an indicator of hospital quality that measures the efficiency and effectiveness of the care services with good clinical practices, resulting in greater patient flow, optimization of installed capacity, and improvement of user services[11].

Data on LOS and total number of patients cared for/admitted to health facilities that implemented the priority LC were extracted from the Hospitalization Authorizations (HA). These data were analyzed considering the resident population (population estimate, broken down by sex and age group) of the municipalities where these facilities are located.

The variables – number of cases and LOS – and the delineation of the age range (0-19, 20-39, 40-59, and 60 or more) were based on the guidelines of the 'Instructional Manual of the Emergency Care Network and Emergencies in the Unified Health System (SUS)', in Resolution No. 7, dated February 24, 2010, of the National Health Surveillance Agency (ANVISA)[14], which provides criteria for the use of ICU beds, adjusted for 19 years based on the delineation of the Brazilian Institute of Geography and Statistics, which breaks down population growth by 5-year age groups, and in the Law of the Elderly[15].

Data were analyzed by LC (cerebralvascular accident – CVA, acute myocardial infarction – AMI, and trauma) and region, year by year, with descriptive and association analyses. Data analyses were performed using IBM SPSS (Statistical Package for the Social Sciences) version 23, 2015. The significance level used throughout the study was 5%, with two-sided tests.

To evaluate the data on total attendances/production (number of HA) and LOS, the averages of the two years immediately before and after the year of LC implementation were calculated. If there was no way to calculate an average (if only data from a year immediately before and immediately after the implementation of the LC were available within the time period studied), only these data were used for the calculation. The year of introduction of the LC was also not taken into account.

The data per population were calculated by dividing the production by the number of inhabitants of the municipality and multiplying by thousand, i.e. the value per population eliminates the population growth bias by evaluating the production rate (number of HA) per thousand inhabitants[16].

First, the quantitative variables were tested for normality of the data distribution, and for all quantitative variables, the

null hypothesis was rejected (Kolmogorov-Smirnov test)[17]. Therefore, nonparametric tests were used to compare differences before and after the implementation of the priority LCs using the Wilcoxon test[18] for dependent samples. Variables are presented using the descriptive measures of mean, median, standard deviation, minimum, maximum, and interquartile range.

Results

The implementation of the Hospital Component in the states totaled 21,388 care points between 2011 and 2019, distributed as follows: Minas Gerais, 3.269; São Paulo, 2.679; Pernambuco, 1.898; Paraná, 1.736; Rio de Janeiro, 1.409; Santa Catarina, 1.266; Rio Grande do Sul, 1.263; Ceará, 978; Bahia, 881; Pará, 783; Goiás, 649; Espirito Santo, 587; Mato Grosso do Sul, 572; Alagoas, 454; Mato Grosso, 396; Roraima, 356; Maranhão, 316; Paraíba, 301; Rio Grande do Norte, 283; Piauí, 273; Amazonas, 231; Sergipe, 219; Amapá, 190; Distrito Federal, 135; Roraima, 127; Tocantins, 105; and Acre, 31.

Table 1 shows quantitative trends in hospital gateways. The states of the Southeast region had greater growth in the number of type I and type II specialized hospitals (SH) and general hospitals (GH), especially in São Paulo, followed by the Northeast region, with Ceará being the state with the highest number of implementations. In general, the Northeast region was the one that enabled the most GH during the study period. In the South region, which quantitatively occupies the third place, all states enabled more type II SH than type I SH and GH. In fourth place, the North region implanted the most GH points. A larger number of points were implemented in the states of Pará and Amazonas. The Midwest region was in last place, where the states of Mato Grosso do Sul and Goiás stand out.

Table 1. Number of qualifications of Hospital Gateways according to type, by region and by UF, in the period between 2011 and 2019

STATE/REGION/TYPE		2011	2012	2013	2014	2015	2016	2017	2018	2019
SP	Specialty Hosp. Type I		2	7	3		3		2	
	Specialty Hosp. Type II	2	7	3	10		3		4	
	General hospital				3		3		3	
MG	Specialty Hosp. Type I	2			3					
	Specialty Hosp. Type II	4				1	5			1
	General hospital					4	5			2
RJ	Specialty Hosp. Type I			2			2			
	Specialty Hosp. Type II		1			3	2		1	
	General hospital			5		2	3	2	1	
ES	Specialty Hosp. Type I			1	1					
	Specialty Hosp. Type II		4							
	General hospital					8		1		
Southeast Subtotal		**8**	**14**	**18**	**20**	**18**	**26**	**3**	**11**	**3**
CE	Specialty Hosp. Type I		1	1			6			1
	Specialty Hosp. Type II	2	1	1			1			
	General hospital			1			6			

STATE/REGION/TYPE		2011	2012	2013	2014	2015	2016	2017	2018	2019
MA	Specialty Hosp. Type I			1						
	General hospital		3	4	1		7			
PE	Specialty Hosp. Type I		2							
	Specialty Hosp. Type II		6		2					
	General hospital			1			1			
BA	Specialty Hosp. Type I				3					
	Specialty Hosp. Type II	1	3		1					
	General hospital		1		1					
SE	Specialty Hosp. Type I	1			1					
	Specialty Hosp. Type II	1								
	General hospital				6					
AL	Specialty Hosp. Type I		2							
	General hospital		1		1				3	
PB	Specialty Hosp. Type II			2						
	General hospital				3				1	
PI	General hospital		2			2	1			
RN	Specialty Hosp. Type II		1							
	General hospital		3							
Northeast Subtotal		**5**	**26**	**11**	**19**	**2**	**22**		**4**	**1**
SC	Specialty Hosp. Type I		2	3				1		
	Specialty Hosp. Type II		6	10			1	1		
	General hospital						5		2	
PR	Specialty Hosp. Type I		1				2	1		
	Specialty Hosp. Type II		5	5			1	4		
	General hospital		3	2			1	2		
RS	Specialty Hosp. Type I		3		1					2
	Specialty Hosp. Type II		5		3					3
	General hospital				8					2
South Subtotal			**25**	**20**	**12**		**10**	**9**	**2**	**7**
PA	Specialty Hosp. Type I		2							
	Specialty Hosp. Type II		1							
	General hospital		7							
AM	Specialty Hosp. Type I		1							
	General hospital		1		6					
TO	Specialty Hosp. Type I				1	1				
	Specialty Hosp. Type II			1						
	General hospital			1	3					
RO	Specialty Hosp. Type II		1							
	General hospital		2		1					1
RR	Specialty Hosp. Type I		1							
	Specialty Hosp. Type II		1							
AP	General hospital		2							
AC	General hospital			2						
North Subtotal			**19**	**4**	**11**	**1**				**1**

STATE/REGION/TYPE		2011	2012	2013	2014	2015	2016	2017	2018	2019
MS	Specialty Hosp. Type I			1						
	Specialty Hosp. Type II		3	1						
	General hospital			7						
GO	Specialty Hosp. Type I		1	1		1				
	Specialty Hosp. Type II	1								
	General hospital				3	2		1		1
DF	Specialty Hosp. Type I						3			
	Specialty Hosp. Type II	1								
	General hospital					3				
MT	Specialty Hosp. Type I		1							
	Specialty Hosp. Type II		1							
	General hospital		2							
Midwest Subtotal		**2**	**8**	**10**	**3**	**6**	**3**	**1**		**1**
Grand total		**15**	**92**	**63**	**65**	**27**	**61**	**13**	**17**	**13**

Source: Own elaboration.

Similar to the Gateways, the Southeast region had the highest number of qualifications for clinical back-up beds, with Minas Gerais leading with 1,737 qualifications, followed by Rio de Janeiro with 931 qualifications (*table 2*). The Northeast region was second in terms of quantity, with the state of Pernambuco enabling the most beds (1,283). The South region was third with 2,071 beds, followed by the North region with 1,171 beds, and finally the Midwest region with 764 beds. Although the Midwest region increased the least in bed count, Tocantins, which is part of the North region, was the state that enabled the least. In the Federal District and in Acre, no back-up beds were added in the Infirmary Clinics during the period studied.

Table 2. Number of qualifications for Clinical Infirmary backup beds, according to type, by region and by UF, in the period 2011-20199

STATE/REGION	2011	2012	2013	2014	2015	2016	2017	2018	2019
MG	315	106	351	223	44	150	191	341	16
RJ			830		8	9	44		40
SP		289		515		72			
ES			30	40	259	18			
Southeast Subtotal	**315**	**395**	**1.211**	**778**	**311**	**249**	**235**	**341**	**56**
PE					15	697	20	245	306
CE					44	606			
BA		462							
AL		176		22		38	20		35
PI		34		14	61	83	18		
RN		159		23					

STATE/REGION	2011	2012	2013	2014	2015	2016	2017	2018	2019
MA			10			145			6
PB						24	40	30	
SE					26				
Northeast Subtotal		**831**	**10**	**59**	**146**	**1.593**	**98**	**275**	**347**
PR		181			44		496	30	
RS				564	53			102	
SC		20		84		291	148	40	18
South Subtotal		**201**		**648**	**97**	**291**	**644**	**172**	**18**
PA		584							
RO		167	29			12			
AP		188							
RR		57			44				
AM				81					
TO			9						
North Subtotal		**996**	**38**	**81**	**44**	**12**			
MT		267							
MS			257	10					
GO					230				
Midwest Subtotal		**267**	**257**	**10**	**230**				
Grand total	**315**	**2.690**	**1.516**	**1.576**	**828**	**2.145**	**977**	**788**	**421**

Source: Own elaboration.

During the period studied, 8,193 ICU beds (*table 3*) of type II and of type III (Adult and Pediatric) were authorized, with the largest number again in the Southeast region, with 3,306 type II and of type III ICU beds. The state that increased the most in quantity was São Paulo, followed by Minas Gerais. Roraima, on the other hand, was the state that was able to integrate the least number of beds in the RUE.

São Paulo also stands out in terms of the number of beds in the adult and pediatric type III ICU, with 451 beds.

Table 3. Number of ICU bed implementation, according to type, by region and by UF, in the period 2011-2019

REGION/STATE /TYPE		2011	2012	2013	2014	2015	2016	2017	2018	2019
SP	Adult ICU II		92	154	370	5	98		137	27
	Adult ICU III			139	107		62		8	21
	Pediatric ICU II			60	61		11		2	
	Pediatric ICU III			67	31		16			
MG	Adult ICU II		70	72	177	23	298	33	101	75
	Adult ICU III			20						
	Pediatric ICU II			1						3
	Pediatric ICU III			13						

REGION/STATE /TYPE		2011	2012	2013	2014	2015	2016	2017	2018	2019
RJ	Adult ICU II			17		48	195		33	112
	Adult ICU III						18			
	Pediatric ICU II						16			4
ES	Adult ICU II			40		140	1		9	9
	Pediatric ICU II					10				
Southwest Subtotal			**162**	**583**	**746**	**226**	**715**	**33**	**290**	**251**
PE	Adult ICU II		37	74	18		268			55
	Adult ICU III		30		38		22			
BA	Adult ICU II		148	121	46	5				14
	Pediatric ICU II		29					7		10
CE	Adult ICU II			18	22		170		4	4
	Pediatric ICU II			23	11		23			
SE	Adult ICU II			10	122					
	Pediatric ICU II				17					
MA	Adult ICU II		55	54		5	8			
	Pediatric ICU II			10					7	
AL	Adult ICU II		52		23	7				
	Adult ICU III				7					
	Pediatric ICU II		6						4	
	Pediatric ICU III				7					
RN	Adult ICU II		22		56					
	Pediatric ICU II				12					
PB	Adult ICU II				25				13	20
	Pediatric ICU II								11	10
PI	Adult ICU II		24			8	7			
	Adult ICU III					5				
	Pediatric ICU II		6				8			
Northeast Subtotal			**409**	**310**	**404**	**30**	**506**	**7**	**39**	**113**
PR	Adult ICU II		189	85	3	15	181	130	22	22
	Adult ICU III		26	80			20	25		
	Pediatric ICU II		32	2			14	16		
	Pediatric ICU III		27	12						
SC	Adult ICU II		42	4	10	5	201	36	7	49
	Adult ICU III		5			4	8			
	Pediatric ICU II		5				41			10
	Pediatric ICU III						2			
RS	Adult ICU II				92				14	116
	Adult ICU III				62					
	Pediatric ICU II				18		4			27
South Subtotal			**326**	**183**	**185**	**24**	**471**	**207**	**43**	**224**
GO	Adult ICU II		7	25	33	189	3			69
	Pediatric ICU II				16	24				8

REGION/STATE /TYPE		2011	2012	2013	2014	2015	2016	2017	2018	2019
MS	Adult ICU II			71						23
	Adult ICU III		11	57						
	Pediatric ICU II			15						4
	Pediatric ICU III			10						
MT	Adult ICU II		83							
	Adult ICU III		14							
	Pediatric ICU II		22							
DF	Adult ICU II						57			20
	Adult ICU III						16			
	Pediatric ICU II						22			
	Pediatric ICU III						2			
Midwest Subtotal			**137**	**178**	**49**	**213**	**100**			**124**
PA	Adult ICU II		70			5				51
	Pediatric ICU II		35							15
RO	Adult ICU II		33	71	4					4
	Pediatric ICU II		6	9						
AM	Adult ICU II		5		69					
	Pediatric ICU II				52					
TO	Adult ICU II		18	22	14	15				
	Pediatric ICU II			6	2	1				10
AC	Adult ICU II			14		8				
	Pediatric ICU II			7						
RR	Adult ICU II		4	10					5	
	Pediatric ICU II								5	
North Subtotal Norte			**171**	**139**	**141**	**29**			**10**	**80**
Grand total			1.205	1.393	1.525	522	1.792	247	382	792

Source: Own elaboration.

Regarding LCU or LCH points of care, it can be seen in *table 4* that, although the state of Espírito Santo didn't activate any unit, most of the qualification of these points of care occurred in the Southeast region, especially Minas Gerais, which enabled 265 LCU beds and 1 LCH of the 1,172 implanted during this period. The region with the fewest LCUs was the North, with only 15 beds in the state of Rondônia and no LCH in the entire region.

Table 4. Number of qualifications of beds for long-term points of care, by region and by UF, in the period between 2011 and 2019

STATE/REGION	2013	2014	2015	2016	2017	2018	2019
MG							
LCH			1				
LCU		65		40	65	45	50
SP							

STATE/REGION	2013	2014	2015	2016	2017	2018	2019
LCU	20	22		60		86	35
RJ							
LCH			1				
Southeast Subtotal	**20**	**87**	**2**	**100**	**65**	**131**	**85**
SC							
LCU		70		15		30	85
RS							151
LCU							151
PR							
LCU				22			
South Subtotal		**70**		**37**		**30**	**236**
PB							
LCU				100			
PE							
LCU							40
AL							
LCU						40	
Northeast Subtotal				**100**		**40**	**40**
MS							
LCH			1				
LCU	68						20
GO							
LCI						25	
Midwest Subtotal	**68**		**1**			**25**	**20**
RO							
LCU		15					
North Subtotal		**15**					
Grand total	88	172	3	237	65	226	381

Source: Own elaboration.

Implementation of priority LCs was again greatest in the Southeast region, with 136 points of care when emergency care centers for stroke patients, trauma centers, and coronary care units are added.

Stroke center implementation was greatest in the South region (32), followed by the Southeast region (24). The two states with the greatest development were Rio Grande do Sul with 21 and São Paulo with 18 centers. In the North region, only two stroke centers were opened in the state of Pará.

As for the implementation of trauma centers, the focus was on the Midwest region. Of the 27 centers implemented, 9 were in this region and 7 of those were in the Federal District. The other 18 centers were established in 9 other states. No trauma center was established in the Northeast region during the study period.

When coronary care unit beds are added, the Northeast region grew the most in terms of quantity. Of the 302 implanted beds, 112 were in this region and another 108 were in the Southeast region. When evaluated by state,

Minas Gerais stands out with the qualification of 45 beds. The state with the fewest coronary unit beds was Tocantins (1). Acre, Amapá, Ceará, Federal District, Maranhão, Piauí, Rondônia, Roraima, Santa Catarina, and S

Production by age group was also evaluated separately for each LC (trauma, stroke, and AMI). *Table 5* shows that production (number of HA) for trauma LC increased significantly in males (0-19 years), even when values per population were considered. For females, there was a significant increase in production (number of HA) when considering population growth in the 20-39 age group. Among the elderly (> 60 years), there was a significant increase in production (number of HA) when the total value is considered, but when the effects of population growth are removed, this increase is no longer statistically significant.

Table 5. Comparative analysis (HA, LOS and population) of Lines of Care (AMI, CVA and Trauma) – South Region (medians and interquartile range (IQR))

	Before		After		
South region	**Median**	**IQR**	**Median**	**IQR**	**p***
Production (Number of HA) – Both sexes	10949.00	17360.50	11101.00	16533.00	0.001
Production Rate x Inhabitants – Both sexes	19.69	30.28	22.15	23.51	0.006
Production (Number of HA) – Male	5619.50	8139.00	5879.00	9096.50	0.003
Production Rate x Inhabitants – Male	19.23	33.09	25.19	23.56	0.011
Production (Number of HA) – Female	6042.00	9297.00	6325.00	9769.50	0.001
Production Rate x Inhabitants – Female	20.42	35.22	23.68	35.11	0.003
Average Length of Stay	5.44	2.61	5.19	2.44	0.031
	Age – Trauma				
Male – 0-19 years old	1543.00	1691.88	2055.75	2513.75	0.036
Male – 0-19 years old (Rate: pop. x inhab.)	18.12	49.47	20.10	52.76	0.025
Female – 0-19 years old	1372.00	2058.50	1564.75	2595.88	0.123
Female – 0-19 years old (Rate: pop. x inhab.)	15.25	47.28	14.75	52.79	0.093
Male – 20-39 years old	1560.25	2393.88	2104.50	2379.25	0.208
Male – 20-39 years old (Rate: pop. x inhab.)	22.87	43.03	26.66	40.27	0.123
Female – 20-39 years old	2362.25	3460.75	2980.00	3888.38	0.069
Female – 20-39 years old (Rate: pop. x inhab.)	20.00	69.46	20.78	77.61	0.025
Male – 40-59 years old	1771.25	3322.00	1953.25	4060.13	0.069
Male – 40-59 years old (Rate: pop. x inhab.)	27.34	82.32	31.55	77.15	0.161
Female – 40-59 years old	1499.00	3339.13	1570.00	3618.50	0.069
Female – 40-59 years old (Rate: pop. x inhab.)	21.21	60.91	23.88	60.71	0.123
Male – 60 or older	1558.00	3990.88	1608.25	5129.63	0.036
Male – 60 or older (Rate: pop. x inhab.)	62.28	191.23	65.04	189.75	0.889
Female – 60 or older	1360.00	3102.25	1494.00	4312.38	0.017
Female – 60 or older (Rate: pop. x inhab.)	38.81	137.90	46.44	129.72	0.327

Source: Own elaboration.

Discussion

Despite the temporal peculiarities in the implementation cycles of the Hospital Component care points, the results of the study showed that the number of care points of the Hospital Component of RUE increased significantly across the country during the period studied. This is a clear response to the inducing effect of the urgent and emergency care policies, particularly the policy establishing the RUE and the policy establishing the Hospital Component, which acted synergistically and, most importantly, provided an increase in financial resources to states and municipalities for this purpose.

However, regional inequalities were maintained. The region most advanced in the implementation of the Hospital Component of the RUE is the Southeast (7,945 qualified points of care), which has historically made the most progress in this regard, but also coexists with a fragmented system[6], followed by the Northeast region, where 5,603 points of care have been activated. The South region enabled 4,267 care points, and the North showed more difficulty during the period studied and still enabled more care points than the Midwest region (North, 1,823 care points; and Midwest, 1,753). These data suggest that the Northeast and North regions have made efforts to improve the RAS[19] and, in particular, are moving, albeit slowly, toward providing care at hospitals in remote regions, which is necessary to reduce disparities in access[20].

In terms of Hospital Gateways, the Southeast region stood out not only for the number, but also for the implementation of care points with more technology[6], such as type II SH.

Since the gateway type must be a reference for its implementation in at least two high-complexity services (neurosurgery, trauma/orthopedics, cardiology/circulation) or in pediatrics, the implementation of priority LCs also followed the same direction, with the Southeast region having the most LC care points (CVA, AMI, and trauma).

Adding the type III LC care points also highlights the South region. Of the 92 type II care points activated during this period, 71 are in the Southeast and South regions. These high-volume facilities – that is, these more specialized and qualified care points – when implemented, still offer economies of scale, a steeper learning curve for professionals, and better quality of service provided[21].

The Northeast region, which stands out when adding all the care points that make up the Hospital Component, was the one that activated the most gateways as GH. Of the total activation of gateways in this region, more than 50% are of type III (of the 91 total activated gateways in the Northeast region, 49 are of the GH type).

The GH facility has a structure for medium-complexity services. These services aim to treat the main health problems and diseases of the population, whose level of complexity in clinical practice requires the availability of specialized professionals and the use of technological resources for diagnostic and therapeutic support[22]. The establishment of a type III gateway is largely dependent on the provision of services rather than on user demand[22,23], in contrast to services with a high degree of complexity, i.e., tertiary care points, which are more spatially concentrated[6].

Even if they aren't able to provide adequate therapies for different specialties[24], these hospitals play an important role in the reach of network services, as they are usually the only option for hospitalization in the community where the facility is located and represent a strategic segment for effective access to health[25]. However, from the perspective of polyarchic networks, there is no relationship of dominance or subordination between primary, secondary, or tertiary points of care. All are important in achieving the common goals of the RAS network[6].

However, a large number of Clinical Infirmary backup beds were also activated

in this region. These beds, which play a support role for the Gateways, must be activated in facilities with more than 50 beds, that is, in strategic facilities or those with lower technological density. Minas Gerais, a state in the Southeast region that stands out in the total amount of implementation of the Hospital Component, was also the state with the highest number of qualifications for backup beds in hospitals.

The Southeast region also stands out for the activation of type III ICU beds, which have a higher technical density. In contrast to the previous points, the South region is in second place and the Northeast region is in fourth place, only ahead of the North region, which didn't enable a single bed of this type. The availability of beds with higher technology not only benefits patients, but also contributes to economies of scale by decreasing the length of stay in bed due to dedicated equipment and a more specialized team, decreasing the use of beds[26].

Considering that LCUs and LCHs represent intermediate units between urgent/emergency hospital care and primary care, and that this type of care is related to continuity of patient care, these results are consistent with those obtained from the analysis of data from the most technologically dense points of care.

Thus, the Southeast region has developed the most in terms of volume, with the state of Minas Gerais standing out, followed by the South region. Another important factor in the importance of this point of care is that the transfer of patients from other points of care to the LCH and LCU significantly increases the supply of vacancies in the tertiary sector[27].

The LC that stood out with a significant increase in the production of HA during the period studied was the trauma facility. In the other areas (AMI and stroke), the number of HA increased, but there was no significant increase when considering population growth.

In analyzing the data obtained, it should also be noted that, with the exception of the South region, the other macroregions didn't show a significant change in production (number of HA), so the influence of population growth and LOS after the implantation of CLs wasn't taken into account.

However, the South region, where most LCs were implanted, also stood out in terms of effectiveness. Even when the influence of population growth is excluded, the number of HA increased significantly in the period after LC implantation. LOS also decreased in this region after the introduction of the line of care.

One of the limitations of the study is the lack of a logical model and better organized data to evaluate the program; however, with the available data, we aimed to show the current state of the implementation of the Hospital Component of the RUE, which has shown progress[28].

Conclusions

A significant increase in the number of care sites of the Hospital Component of the RUE was observed throughout the country, but it was concentrated in the Southeast region, especially care sites with higher technological density. The South region had the highest number of LC implantations and also stood out in terms of increases in HA and lower LOS. The Trauma LC had an increase in HA production.

The RUE in its breadth with all its components needs to be continuously thought through and adjusted to reduce persistent regional disparities as well as adhere to recommended guidelines and comprehensive care for SUS users.

Collaborators

Radel ME (0000-0001-5561-784X)* and Shimizu HE (0000-0001-5612-5695)* contributed to the conception and design of the study; collection, analysis and interpretation of data; critical review of the intellectual content; final approval of the version to be published; and agreement to be responsible for all aspects of the engagement. ■

*Orcid (Open Researcher and Contributor ID).

References

1. Shimizu HE. Percepção dos gestores do Sistema Único de Saúde acerca dos desafios da formação das Redes de Atenção à Saúde no Brasil. Physis. 2013 [acesso em 2021 fev 5]; 23(4):1101-22. Disponível em: https://www.scielo.br/j/physis/a/5PvTNwTTfRSXwXRtJFXTwCd/.

2. Shimizu HE, Carvalho ALB, Bretas Junior N, et al. Regionalização da saúde no Brasil na perspectiva dos gestores municipais: avanços e desafios. Ciênc. saúde coletiva. 2021 [acesso em 2021 set 10]; (262):3385-3396. Disponível em: https://www.scielo.br/j/csc/a/PcGfvXTSWTxWWKdMbkNNQmw/?format=pdf.

3. Viana ALD, Bousquat A, Pereira APCM, et al. Tipologia das regiões de saúde: condicionantes estruturais para a regionalização no Brasil. Saúde Soc. 2015 [acesso em 2020 mar 2]; 24(2):413-422. Disponível em: https://www.scielo.br/j/sausoc/a/5zVsFNHY6HFYBrc9KfPDJzg/?format=pdf.

4. Padilha ARS, Amaral MA, Oliveira DC, et al. Fragilidade na governança regional durante implementação da Rede de Urgência e Emergência em Região Metropolitana. Saúde debate. 2018 [acesso em 2021 out 16]; 42(118):579-93. Disponível em: https://www.scielo.br/j/sdeb/a/VSm7zn7r5nYbPWNzWj9kGdk/.

5. Brasil. Ministério da Saúde. Portaria nº 4.279/GM/MS, de 30 de dezembro de 2010. Estabelece diretrizes para a organização da Rede de Atenção à Saúde no âmbito do Sistema Único de Saúde (SUS). Diário Oficial da União. 31 Dez 2010.

6. Mendes EV. As Redes de Atenção à Saúde. Brasília, DF: Organização Pan-Americana de Saúde; 2011.

7. Brasil. Ministério da Saúde. Portaria nº 1600/GM/MS, de 7 de julho de 2011. Reformula a Política Nacional de Atenção às Urgências e institui a Rede de Atenção às Urgências no Sistema Único de Saúde (SUS). Diário Oficial da União. 8 Jul 2011.

8. Brasil. Ministério da Saúde. Portaria de Consolidação nº 3/GM/MS, de 28 de setembro de 2017. Consolida as normas sobre as redes do Sistema Único de Saúde. Diário Oficial da União. 3 Out 2017.

9. Brasil. Ministério da Saúde. Portaria de Consolidação nº 6/GM/MS, de 28 de setembro de 2017. Consolida as normas sobre o financiamento e a transferência dos recursos federais para as ações e os serviços de saúde do Sistema Único de Saúde. Diário Oficial da União. 3 Out 2017.

10. Brasil. Ministério da Saúde. Portaria GM/MS nº 2395, de 11 de outubro de 2011. Organiza o Componente Hospitalar da Rede de Atenção às Urgências no âmbito do Sistema Único de Saúde (SUS). Diário Oficial da União. 13 Out 2011.

11. Brasil. Ministério da Saúde. Manual Instrutivo da Rede de Atenção às Urgências e Emergências no Sistema Único de Saúde (SUS). Brasília, DF: Editora do Ministério da Saúde; 2013.

12. Lima LL, D'Ascenzi. Implementação de políticas públicas: perspectivas analíticas. Rev. Sociol. Polit. 2013; 21(48)

13. Bolela F, Carvalho Jericó M. Unidades de Terapia Intensiva: considerações da literatura acerca das dificuldades e estratégias para sua humanização. Esc Anna Nery. 2006 [acesso em 2020 jul 25]; 10(2):301-308. Disponível em: https://www.scielo.br/j/ean/a/bzWqL4GBZhk74wJn637bbjB/?lang=pt.

14. Brasil. Ministério da Saúde, Agência Nacional de Vigilância Sanitária. Resolução nº 7, de 24 de fevereiro de 2010. Dispõe sobre os requisitos mínimos para funcionamento de Unidades de Terapia Intensiva e dá outras providências. Diário Oficial da União. 11 Jan 2010.

15. Brasil. Ministério da Saúde. Estatuto do Idoso. 3. ed., 2. reimpr. Brasília, DF: Ministério da Saúde, 2013. 70 p.

16. Ramos AL P, Seta MHD. Atenção primária à saúde e Organizações Sociais nas capitais da Região Sudeste do Brasil: 2009 e 2014. Cad. Saúde Pública. 2019

[acesso em 2021 jan 30]; 35(4). Disponível em: https://doi.org/10.1590/0102-311X00089118.

17. Berger VW, Zhou Y. Kolmogorov-Smirnov test: Overview. Wiley Statsref: Statistics Reference Online. 2014. [acesso em 2021 jan 30]. Disponível em: https://doi.org/10.1002/9781118445112.stat06558.

18. Rey D, Neuhäuser M. Wilcoxon-Signed-Rank Test. Berlin: Springer; Heidelberg; 2011. Disponível em: https://doi.org/10.1007/978-3-642-04898-2_616.

19. Sousa ABL, Garnelo L, Mota PHS, et al. Regional health network in the Amazonian context: the case in Manaus, Entorno and Alto Rio Negro. Rev. Bras. Saude Mater. Infant. 2017 [acesso em 2021 mar 30]; (supl1):239-248. Disponível em: https://doi.org/10.1590/1806-93042017005100011.

20. Rechel B, Džakula A, Duran A, et al. Hospitals in rural or remote areas: An exploratory review of policies in 8 high-income countries. Health Policy. 2016 [acesso em 2021 ago 18]; 120(7):758-69. Disponível em: https://doi.org/10.1016/j.healthpol.2016.05.011.

21. Ramos MC, Barreto JOM, Shimizu HE, et al. Regionalization for health improvement: A systematic review. PLoS ONE. 2020 [acesso em 2021 out 2]; 15(12):e0244078. Disponível em: https://doi.org/10.1371/journal.pone.0244078.

22. Solla J, Chioro A. Atenção Ambulatorial Especializada. In: Giovanella L, Lobato LVC, organizadoras. Políticas e Sistemas de Saúde no Brasil. 2. ed. Rio de Janeiro; 2012. p. 1-35.

23. Borsato FG, Carvalho BG. Hospitais gerais: inserção nas redes de atenção à saúde e fatores condicionantes de sua atuação. Ciênc. saúde coletiva. 2021; 26(4):1275-88.

24. Lavras C. Atenção Primária à Saúde e a Organização de Redes Regionais de Atenção à Saúde no Brasil. Saúde Soc. 2011 [acesso em 2021 out 2]; 20(4):867-874. Disponível em https://www.scielo.br/pdf/sausoc/v20n4/05.pdf.

25. Silva JFM, Carvalho BG, Domingos CM. Health governance and the public-private relationship in small municipalities. Ciênc. saúde coletiva. 2018; 23(10):3179-88.

26. Reis GR, Pires A, Rossone DF, et al. A importância da mobilização precoce na redução de custos e na melhoria da qualidade das Unidades de Terapia Intensiva. Rev Aten Saude. 2018; 16(56):94-100.

27. Pazin-Filho A, Almeida E, Cirilo LP, et al. Impacto de leitos de longa permanência no desempenho de hospital terciário em emergências. Rev Saude Publica. 2015; (49):83.

28. Jorge AO, Coutinho AAP, Fagundes AMS, et al. Entendendo os desafios para a implementação da rede de atenção às Urgências e Emergências no Brasil: uma análise crítica. Divulg. Saúde debate. 2014 [acesso em 2021 out 2]; (52):125-45. Disponível em: https://pesquisa.bvsalud.org/portal/resource/pt/lil-774074.

Received on 05/14/2022
Approved on 11/23/2022
Conflict of interests: non-existent
Financial support: non-existent