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Healthcare Networks in Metropolitan Areas - The Case of the Health System in Brazil

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Abstract

The health care system in Brazil - given its size and geographic scope - is an example of the complexity and often fragmentation in health policy implementation. In the middle of this health systems' fragmentation, the concept of Healthcare Networks emerges and consolidates. The notion of healthcare networks proposes that the health system must be organized through coordinated points to provide continuous and integrated care, based on cooperation between managers, providers, and users. In Brazil in 2010, the Ministry of Health enacted an ordinance defining the healthcare network as a management model to be pursued by the national health policy in order to address most of the difficulties of fragmentation. The Brazilian health policy is decentralized and is the responsibility of municipalities to implement it through federal funds. However, a defining feature of healthcare networks is their regional character, as it becomes necessary to go beyond the municipal boundaries for resource optimization. This scenario of inter-regional relations gains greater density when the territory is configured in an urban superstructure, as it is in the case of metropolitan regions. In this sense, a deeper analysis of the governance forms of Healthcare Networks in a metropolitan scale becomes very fruitful. Thus, this paper proposes to discuss the cases of Healthcare Networks in Brazilian metropolitan regions, characterizing its implementation process as well as identifying management problems in the various cases. This study, which is part of a post-doctoral research, is grounded on data provided by agencies responsible for health management in the federal and state levels, as well as the current literature on healthcare networks. Results include the analysis of metropolitan networks implemented within their different stages, challenges and advances.

Keywords: Brazil, Healthcare Networks, Metropolitan Regions.

Introduction

Health care systems are social responses deliberately organized to meet the demands and preferences of societies. In this sense, they must be linked to the health needs of these societies, which are expressed in unique demographic and epidemiological situations. There is therefore a close relationship between the evolution of the health conditions of a given population and the transition of health care systems.

For this reason, when an inconsistency between the conditions of health and the health care system occurs in any society, it highlights a crisis in the health care model. There is currently a global crisis in health systems, which reflects the mismatch between an epidemiological situation dominated by chronic conditions and a health care system aimed primarily at responding to acute conditions[1].The World Health Organization (WHO) states that, historically, acute problems such as infectious diseases and traumas are the main concern of health care systems, and warns:*"To cope with the rise of chronic conditions, it is imperative that health systems transpose this predominant model"*[2].

In this sense, new proposals to care for chronic conditions are gaining strength worldwide through a coordinated and continuous system. The notion of integrated health care is one of the pillars of Healthcare Networks (HN), which are based on cooperation between managers, providers, and users[3]. Contemporaneously, HN's took shape with integrated health systems deployed in the early 90s in the United States. According to pioneering research in this country[4], integrated systems for delivery of health services are characterized by: a focus on the health needs of the population; coordination and integration of care across a continuum; information systems that connect users, service providers and managers; information on costs, quality, and user satisfaction; use of financial incentives and organizational structures to align governance, managers, and health professionals in the pursuit of goals; and continuous improvement of the services provided.

Many countries have already had successful experiences in integrating their health systems by implementing Healthcare Networks. Brazil is advancing in this direction and in order to cope with most of the fragmentation difficulties, the Ministry of Health has sought to strengthen the design of networks in the operation of the National Health System[5].

One of the first steps towards the development of healthcare networks is the definition of a restricted population whose overall health will be under the network's care. The definition of this population involves a regionalization process, whereby "health regions" are defined. These health regions do not

[1]MENDES (2011)
[2]WORLD HEALTH ORGANIZATION (2003, p.46)
[3]The original concept of structuring Healthcare Networks dates back to the Dawson Report, published in 1920 in England (DAWSON, 1964). This report highlighted some key points such as the integration of preventive and curative medicine, the central role of the general practitioner, and the entrance through Primary Health Care.
[4]SHORTELL et al. (1993)
[5]BRAZIL (2010)

always coincide with the political and administrative boundaries, which raises the challenge of cooperative management in the network. Therefore an articulation of different bodies, agencies, and levels of government is necessary for the proper functioning of the network.

This scenario of inter-regional relations gains greater density when the territory is configured in an urban superstructure, as it is in the case of metropolitan regions. In these regions, the conurbation process dissolves the municipal administrative boundaries and requires cooperation between different cities in the search for economies of scale and scope in their health systems. In this sense, an analysis of the implementation of healthcare networks on a metropolitan scale is very fruitful.

Thus, this paper proposes to discuss the cases of Healthcare Networks in Brazilian metropolitan regions, characterizing its implementation process as well as identifying management problems in various cases. The study is basedon data provided by agencies responsible for health management in the federal, state, and municipal levels, as well as the current literature on healthcare networks.

The paper is divided into 4 sections, including this introduction. Section 2 briefly presents the Brazilian Health System. Section 3 presents data relating to metropolitan regions and the experiences of healthcare network in these areas. Finally, the paper concludes with final remarks highlighting the advances and challenges for the consolidation of healthcare networks in Brazil.

The Brazilian Health System

Until the 1930's, a national health system did not properly existin Brazil. The effective state of health intervention began in this decade and consolidated its profile until the mid-1960's. The standard established in this period was a centralized federal government policy. Until the mid-1970's the system expanded significantly, expanding service coverage to an increasing volume of users. However, this growth dictated the need to reform the system, which began to suffer from its own gigantic size. Thus, in the second half of the 1970's, pressures increased for reform based on the integration of the three levels of government (federal, state, and municipal) and decentralization. It is in this context that in the 1980's, especially with the promulgation of the Federal Constitution (FC, 1988), the country began to form a new system of universal public health called the Unified Health System (UHS)[1].

In 1993, the Standard Operating Base of UHS marked the first steps of an administrative decentralization of the health system. This standard explicitly defined the municipality as the manager of health services and established the responsibilities and forms of funding. In addition, it establishedmanagement arrangements between the three government levels (federal, state, and municipal)[2].

[1]DRAIBE & AURELIANO (1989)
[2]BRAZIL (1993)

After the process of decentralization in the 1990's, regionalization has occupied a prominent role in the national health policy during the 2000's. In this context, agreements between the Ministry of Health and other levels of government to consider the welfare priorities of each state were signed, subdividing the system into regions and micro-regions of health[1].

The strategies toward comprehensive care went through the deployment and consolidation of a new model of primary care; the Family Health Program. This program is operated by multidisciplinary teams in primary healthcare units. Each team is responsible for monitoring a maximum of 4,000 inhabitants of a given area. The Family Health Program structured in local health systems has led to a major reorganization of the care model and produced positive results in major health indicators of the assisted populations[2].

The debate on the further integration of the health system acquired new emphasis from the publication of the document "Health Pact"[3], which emphasizes the importance of deepening the process of regionalization and organization of the system into an integrated manner. Advancing further in this direction in 2010, the Ministry of Health sought to strengthen the design of networks in the operation of the UHS, with the publication of one ordinance concerning the organization of the Healthcare Networks in it. This ordinance defines healthcare networks as *"organizational arrangements, actions, and health services to be integrated by technical, logistical, and management support systems, seeking to ensure comprehensive care"*[4].

Since then, some implementation strategies have been established and are in progress for the construction of this new model of care in networks. Through technical and financial support, The Ministry of Health has prioritized and promoted the implementation of thematic networks, such as: "Stork Network" (Comprehensive care of pregnant, postpartum, and children up to 24 months), Emergency Care Network, Psychosocial Care Network (with priority for addressing alcoholism, crack addiction, and other drugs), Network of Care for Persons with Disabilities, Occupational Health Network, Elderly Health Network, among others[5].

Among the tools to manage these thematic networks, the most used in the Brazilian model is the creation of Lines of Care (LC). The Lines of Care are a form of joint resources and production practices among health care units in a given region for timely, responsive, and unique treatment of users by way of diagnosis and therapy. The goal is to coordinate care along the continuum and the connectivity of roles and tasks of different professionals and points of attention. The implementation of the LC occurs from the Primary Health Units, which have responsibility for care coordination and management of the network. Examples of lines of care implemented in the Brazilian system are: Arterial Hypertension Line Care, Diabetes Mellitus Line Care, Acute

[1]BRAZIL (2001)
[2]DAB (2014)
[3]BRAZIL (2006)
[4]BRAZIL (2010, p. 5).
[5]BRAZIL (2010)

Myocardial Infarction Line Care, Stroke Line Care, Trauma Care Line, Breast Cancer Line Care and others[1].

The Metropolitan Challenge

In this section we intend to briefly characterize the Brazilian Metropolitan Regions (MRs) and contextualize them in the national health system. In addition, we seek to highlight some factors that make the integration of health services in these regions a complex challenge. Finally, we present the evidence found on the implementation of healthcare networks in some metropolitan regions.

The first metropolitan regions of Brazil were formally created between the 1960's and 1970's. Currently, there are 39 metropolises in Brazil, which are not only characterized by a concentration of most of the population and national wealth, but also by having significant pockets of poverty and social exclusion. The metropolitan municipalities differ substantially from each other as to the metro polization process, ie, levels of population density and economic activities, which hinders the formulation of public policies for these regions. Table 1 characterizes the Brazilian metropolitan regions with respect to demographics.

Table 1. *Demographics of Brazilian Metropolises, 2010*

Metropolitan Region	Number of municipalities	Number of inhabitants	% of the state population
São Paulo	39	19 683 975	47,70%
Rio de Janeiro	19	11 835 708	74,02%
Belo Horizonte	48	5 414 701	27,63%
Porto Alegre	31	3 958 985	37,02%
Brasília*	22	3 717 728	-
Recife	14	3 690 547	41,95%
Fortaleza	15	3 615 767	42,78%
Salvador	13	3 573 973	25,50%
Curitiba	26	3 174 201	30,39%
Campinas	19	2 797 137	6,78%
Goiânia	20	2 173 141	36,20%
Manaus	8	2 106 322	60,46%
Belém	6	2 101 883	27,73%
Vitória	7	1 687 704	48,01%
Baixada Santista	9	1 664 136	4,03%
Natal	10	1 351 004	42,64%
São Luís	5	1 331 181	20,25%
João Pessoa	13	1 198 576	31,82%
Maceió	11	1 156 364	37,06%

[1]BRAZIL (2010)

Teresina	14	1 150 959	36,91%
NE Santa Catarina	20	1 094 412	17,51%
Florianópolis	22	1 012 233	16,20%
Aracaju	4	835 816	40,42%
Cuiabá river	4	833 766	27,47%
Londrina	8	764 348	7,32%
Vale do Itajaí	16	689 731	11,04%
Campina Grande	23	687 039	18,24%
Petrolina/Juazeiro*	8	686 410	-
Vale do Aço	26	615 297	3,14%
Maringá	13	612 545	5,86%
Agreste Alagoano	20	601 049	19,26%
Cariri	9	564 478	6,68%
Carbonífera	25	550 206	5,15%
Foz do Itajaí	9	532 771	8,53%
Macapá	2	499 466	74,60%
Chapecó	25	403 494	6,46%
Tubarão	18	356 721	5,71%
Lages	23	350 532	5,61%
Southwest Maranhão	8	345 873	5,26%

Note: * Metropolitan regions composed by the conurbation of two or more states.
Source: Elaborated by authors based on IBGE, population census (2010)

The data show extensive heterogeneity with respect to the number of cities and population representativeness. The number of cities that make up the metropolitan regions (MRs) vary from 2 to 48. There are nine MRs which represent more than 40% of their state's population. There are also MRs composed of numerous small municipalities, which do not have a significant population. This can be explained by the fact that some states have more than one metropolitan area.

With respect to the health system in Brazil, the direct relationship of the Union with municipalities (a result of the decentralization process) imposed difficulties forth challenge of metropolitan health management. The gain of municipal autonomy contributed to generate an "institutional vacuum" in the metropolitan scale, to the extent that the metropolitan regions, although recognized by the Constitution, are not federal entities, i.e., autonomous units of government. This ambiguous legal situation emphasizes the difficulties in integrating the planning and implementation of health policy (among many other urban policies), and expresses a reality still quite permeated by conflicts

and uncertainties about the compromising level of action[1]. Table 2 presents the data for the Health System in metropolitan regions[2].

Table 2. *Health Data in Brazilian Metropolitan Regions*

Metropolitan Region	Doctor consultation per person*	Hospitalization per 100 population*	Hospital beds per 1000 population **	Number of higher education professionals in health per 1000 population***
Reference year	2012	2012	2012	2009
São Paulo	3,09	4,96	1,17	2,70
Rio de Janeiro	2,21	3,35	1,7	2,93
Belo Horizonte	2,37	5,05	1,44	3,59
Porto Alegre	2,58	6,58	1,83	4,07
Brasília	2,44	5,16	1,36	4,23
Recife	2,69	6,02	2,33	4,44
Fortaleza	1,74	4,84	1,86	4,65
Salvador	2,52	4,97	1,72	4,96
Curitiba	2,55	6,47	1,81	5,25
Campinas	2,7	4,54	0,98	5,28
Goiânia	2,45	6,23	2,18	5,62
Belém	2,7	5,94	1,58	5,99
Vitória	2,83	5,01	1,32	6,00
Baixada Santista	3,46	4,47	0,92	6,03
Natal	2,37	4,56	1,79	6,32
São Luís	3,42	5,18	2,43	6,90
João Pessoa	2,48	6,2	2,35	7,01
Maceió	3,3	5,08	2,25	7,08
Teresina	2,36	5,79	2,19	7,10
NE Santa Catarina	2,33	5,31	1,37	7,29
Florianópolis	2,87	5,21	2,41	7,41
Londrina	3,32	6,79	2,03	7,56
Vale do Itajaí	6,65	5,99	1,1	7,74
Petrolina/Juazeiro	1,9	5,91	1,18	7,74
Vale do Aço	1,57	5,39	1,19	8,11
Maringá	2,54	6,97	1,76	8,19
Carbonífera	3,59	6,61	1,85	8,29

[1]GARSON (2007)
[2]Health data were not available for 9 of the 39 metropolitan regions (Manaus, Aracaju, Cuiaba river, Campina Grande, Agreste Alagoano, Cariri, Chapecó, Lages and southwest of Maranhão).

Foz do Itajaí	2,54	5,66	1,26	8,72
Macapá	1,86	5,67	1,37	9,11
Tubarão	2,35	6,76	1,83	9,40
BRAZIL	**2,77**	**5,67**	**1,69**	**5,69**

Source: *Ministry of Health / Datasus - Outpatient Information System (2012); ** Ministry of Health / National Registry of Health (2012); *** IBGE - Medical and Health Care Research (2009) and IBGE - Population census (2010)

The number of doctor consultations per person in metropolitan areas varies between 1.57 and 6.65; the national average is 2.77, therefore 9 (30%) metropolitan regions outweigh the national average. Hospitalizations per 100 inhabitants varies between 3.35 and 6.97 with the national average being 5.67, which means that 14 (46,7%) metropolitan regions exceed this average. The number of hospital beds (attended by the Unified Health System) per 1,000 inhabitants varies from 0.92 to 2.43. As the average of Brazil is 1.69, 17 (56,7%) metropolitan regions have values that surpass it. Finally, the number of health professionals occupying top-level jobs have the greatest variation (2.7 to 9.4) and 19 (63%) regions exceed the national average.

With regard to data on healthcare networks in metropolitan regions, evidence of HNs was found in 16 of 39 metropolitan regions[1]. Due to the aforementioned recent ordinance of the Ministry of Health (2010), the experiences of HN are beginning to spread across the country. However, it is an ongoing process. Thus, the status progress analysis was made based on the following criteria:

- *Status – <u>incipient</u>:* Experiences reporting that teams of State Health Departments are discussing internally what HN are, performing educational processes to the central level for institutional support.
- *Status – <u>in consolidation</u>*: Experiences reporting development of the first steps in organizing HN: definition of health regions; mapping of resources and needs; approach with other actions; meeting of regional boards; defining flows.
- *Status – <u>consolidated</u>*: Experiences reporting results of networks in action through monitoring and evaluation indicators of HN.

It is worth to say that this phenomenon takes place in 41% of the MRs. For all the records found in the present study, 9 (56% of this subtotal) HN cases were classified as “incipient” and 7 (44%) as “in consolidation” process. No evidence cases already consolidated with published results were found. CONASS (2012) also found that in most states the healthcare networks are in the early stages of their processes, which corroborates the evidence found for the metropolitan regions in this research. Table 3 presents the data for the Healthcare Networks in metropolitan regions.

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[1]The evidence concerning the existence of HNs and Lines of Care in different metropolitan regions were obtained from several sources: state and municipal Departments of Health, scientific publications that report experiences, news reports and newsletters. As this is a recent process in consolidation in the country, for some MRs evidence of HN deployment were not found.

Table 3. *Healthcare Networks in Brazilian Metropolitan Areas (continue)*

Metropolitan Region	Thematics Healthcare Networks	Lines of care	Process status	Sources
Manaus	SN	PP – LC	Incipient	State of Amazonas: Department of Health (2011).
Belém	SN; ECN; PCN; NPD	PP – LC; CVA/AMI – LC; ACD – LC	Incipient	State of Pará: State Department of Health (2012); City of Belém (2012)
Fortaleza	SN; ECN; PCN; NPD; OHN	PP – LC; CVA/AMI – LC; ACD – LC; EH – LC; AH – LC	In consolidation	State of Ceará: State Department of Health (2014); State of Ceará: State Department of Health (2012)
Recife	SN; EHN; AHN	PP – LC; ACD – LC; EH – LC; AH – LC	Incipient	State of Pernanbuco: State Department of Health (2014); City of Recife : Municipal Health Department (2009)
Salvador	SN; ECN	PP – LC; TC – LC	In consolidation	State of Bahia: State Department of Health (2012a); State of Bahia: State Department of Health (2012b)
Belo Horizonte	SN; ECN; EHN	PP – LC; OO – LC	In consolidation	City of Belo Horizonte: Secretary of shared management (2014); Municipal Health Department (2009)
Vale do Aço	SN; ECN; WHN	PP – LC; CVA/AMI – LC; BC – LC	Incipient	Gama (2009); Diário do Aço Journal (2013)
Vitória	SN	PP – LC;	Incipient	Brazil (2014); State of Espírito Santo: Department of Health (2012)
Rio de Janeiro	SN; ECN; PCN	PP – LC; CVA/AMI – LC; ACD – LC	In consolidation	Stateof Rio de Janeiro: StateDepartmentof Health (2014); Stateof Rio de Janeiro: database (2008)

Table 3. *Healthcare Networks in Brazilian Metropolitan Areas (continuation)*

São Paulo	SN; ECN; EHN; HCN	PP – LC; CVA/AMI – LC; ACD – LC; TC – LC; BC – LC; HA – LC	In consolidation	Council of Municipal Health Secretaries (2012); State Department of Health (2012); State of Sao Paulo: sub-secretary of metropolitan development (2014)
Campinas	SN; NCD	PP – LC; D – LC	Incipient	MetropolitanAgencyof Campinas (2012)
Curitiba	SN; ECN	PP – LC; CVA/AMI – LC;	In consolidation	City of Curitiba : Municipal Health Department (2013); State of Paraná: Urban Development Department (2014)
Londrina	AHN	AH – LC; CH – LC	Incipient	City of Londrina: Municipal Health Department (2013)
Porto Alegre	SN; OHN; MHN	PP – LC; AH – LC; BC – LC; MH – LC;	In consolidation	State of Rio Grande do Sul: State Department of Health (2014a), (2014b) (2011)
Goiânia	ECN; PCN	TC – LC	Incipient	City of Goiânia: Municipal Health Department (2012); State of Goiás: State Department of Health (2014)
Brasília	SN	PP – LC .	Incipient	Federal District: department of metropolitan development (2013); Federal District: Department of Health (2014)

Source: Elaborated by authors.

LEGEND:

Thematics networks:

SN - "Stork Network" (Comprehensive care to pregnant, postpartum and child)
ECN - Emergency Care Network
PCN - Psychosocial Care Network
NPD - Network of Care for Persons with Disabilities
OHN - Occupational Health Network
EHN - Elderly Health Network
AHN - Adolescent Health Network
HCN - Home Care Network
MHN -Mental health care Network
WHN - Women Health Network
NCD - Network of attention to chronic diseases

Lines of Care:

PP – LC: Pregnant and postpartum Line of Care
CVA/AMI – LC: Cerebrovascular accident (CVA) and Myocardial Infarction (AMI) Line of Care
ACD – LC: Coping with Alcohol, Crack and Other Drugs Line of Care
EH – LC: Elderly health Line of Care
AH – LC: Adolescent health Line of Care
CH – LC: Children health Line of Care
TC – LC: Traumatology and Cardiovascular Line of Care
OO – LC: Ophthalmology and otolaryngology Line of Care
BC – LC: Breast and Cervical Cancer Line of Care
HA – LC: Arterial Hypertension Line of Care
D – LC: Diabetes Line of Care
MH – LC: Mental Health Line of Care

As a whole, the implementation experiences of 11 different thematic healthcare networks in metropolitan regions were registered. Undoubtedly the most developed thematic network so far is the "Stork Network" (SN - Comprehensive care for pregnant women, postpartum, and children), present in 14 of the 16 regions. The second most important network deployment is the Emergency Care Network (present in 9 MRs), followed by the Psychosocial Care Network (3 MRs), Elderly Health Network (3 MRs), Network of care for People with Disabilities (2 MRs), Occupational Health Network (2 MRs), Adolescent Health Network (2 MRs) Mental health Network (1 MR), and lastly the Women Health Network (1 MR).

These results corroborate those found in CONASS (2012), which published the papers presented at the event "The State and Healthcare Networks: 1st Show of experiences." This publication compiles the experiences of HNs in Brazil (not necessarily metropolitan regions). The results of this publication also show that the most developed network in the country is the "Stork Network," then the Emergency Care Network.

Final Considerations

From the literature data and experiences studied, we could notice some points that represent advances in the consolidation of healthcare networks in Brazilian metropolitan regions as well as points that express the difficulties and obstacles to be faced in this trajectory.

As advances we can cite the approach and integration movement between different areas of the state Health Departments in articulating shared planning and implementation of strategies and actions. In some cases this integration fostered the articulation of different projects and programs developed by optimizing the use of resources. Another positive point to be noted was the attempt to improve the dialogue between the various levels of government (municipal, regional, state, and federal) for the convergence of the projects and actions. Finally, the movement of dissemination and socialization of existing experiences in various institutions provides a constant construction and consolidation dynamic for this new model of care.

On the other hand, some difficulties were quite clear, for example, the need to redefine the funding criteria that remain fragmented and dissociated from this new form of organization. In addition, several reports suggest that the integration of health professionals and information systems are the main challenges facing the consolidation of networks in the Brazilian health system. Other bottlenecks include the establishment of criteria to define the populations ascribed to health regions, the lack of commitment of some municipalities with planning activities, and the undeveloped culture of monitoring and evaluation of networks.

To these challenges is added the complex scenario of managing public policies on a metropolitan scale in which the geographical delimitation (metropolitan region) is not considered a federal entity, ie, an autonomous government entity. This makes the process of formation of a unified and integrated health system complex. In this sense, the setting of a metropolitan system of health care becomes a huge challenge,

since it presupposes the organization of a "regionally coordinated system," in a context where the institutional mechanisms available to the regional level are more fragile and more dependent on the interests of the actions. In this context the development of new forms of governance, tools, mechanisms, and institutional arrangements that favor the management of a regional healthcare network is imperative.

However, this scenario does not escape the expected. The by PanAmerican Health Organization (2010),analyzing HN experiences across America, asserts that integration processes are difficult, complex, and long term based. This is because the integration processes require larger systemic changes, not just isolated and targeted interventions. Considering this, one can say that Brazil is taking key steps toward this structural and systemic change in their health system.

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