

Chaos, organization and creativity: integrative review on Health Care Networks

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Abstract *Since 2010, the organization of the Brazilian Unified Health System has as its main model the Health Care Networks, based on the Integrated Health Service Networks recommended by the Pan American Health Organization. This study aims to analyze the scientific production on Health Care Networks the integrative literature review method. The research was conducted in databases using the descriptors: Health Care Network and its counterparts in Portuguese and Spanish. A total of 27 articles were selected, including conceptual studies, case reports, implementation analyses and evaluation studies. The analysis of the publications evidenced five cores of meaning: the Health Care Network paradigm; Primary Care as network coordinator; regionalization, networks and regional governance; network care; and challenges for implementation. The results of this review point to two central questions: how to overcome the fragmentation of care, ensuring integrality, composing health care networks from distinct theoretical conceptions? And how can the production of care networks impact inter-federative relations, the financing process, the access to the system and the quality of health care processes?*

Key words *Health Care Networks, Integrated Health Service Networks, Health Systems*

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Introduction

In Brazil, the Unified Health System (SUS) was conceived and is organized through a regionalized and hierarchical network of services and actions, which aim to ensure that health is a constitutional right. In its construction process, several regulations have induced organizational arrangements based on guidelines such as decentralization, municipalization, regionalization, society participation and inter-federative management, characterizing innovations in the structure of the State and in the public administration of the country¹. Although the current national political scenario of inflecting public policies and suppressing rights, the materialization of organizational guidelines of decentralization and regionalization was observed, which provided advances and also challenges in the structuring of the health system².

Since 2010, the organization model of SUS has as its main reference the Health Care Networks (in Portuguese *Redes de Atenção à Saúde* - RAS), which are based on the Integrated Health Service Network recommended by the Pan American Health Organization³. This model, which has been used in countries undergoing demographic and epidemiological transition where chronic conditions prevail⁴, has been shown as an alternative to the fragmentation of health systems⁵ and indicates the centrality of primary care in networks⁶⁻⁸.

The main justifications to implement RAS are the need to organize systems in order to respond the threefold disease burden – infectious, chronic and external causes – and to obtain better economic, epidemiological and comprehensive health care results⁴. To this end, the organization of networks consisting of several points of health care is advocated, with centrality of Primary Care, logistic and support systems⁹. According to Silva e Magalhães Junior¹⁰, the implementation of RAS is also justified by the need for continued health care for people with chronic conditions, as a strategy to ensure integrality, and by the economy perspective of scale and scope.

Cecílio¹¹ proposed a revision of the hierarchical pyramid model, consisting of primary, secondary and tertiary care, pointing out the need for a health system organized from the logic of what would be more important for each patient, and thus offer the right technology in the right space and at the most adequate time. Hartz and Contandriopoulos¹² also proposed a “system without walls”, in which the barriers of access be-

tween the various levels of care would be eliminated, in response to the health needs at local and regional levels. Finally, the legal regulation that instituted RAS in Brazil proposed a polyarchic model of system, consisting of different points of health care and of the links that communicate them, with the aim of obtaining the best results, both epidemiological and of health care integrality¹³.

Thus, induction by the Ministry of Health for implementing the Health Care Networks, from 2011, represented a new stage of SUS organization, aiming at ensuring the integrality of care and changing the modes of health care production through priority thematic networks, which were named as *Rede Cegonha*, *Rede de Urgência e Emergência*, *Rede de Atenção Psicossocial*, *Rede de Saúde da Pessoa com Deficiência* and *Rede de Atenção às Doenças Crônicas*¹⁴.

Considering the relevance of the Health Care Network Policy, it is essential to conduct studies that may analyze and disseminate the publications that investigated the theme, aiming at increasing the visibility and motivating the realization of new scientific productions on RAS to support the processes of formulation, implementation and evaluation of health policies in SUS. Peiter et al.¹⁵ analyzed the research trend on RAS in Brazilian theses and dissertations, from the database of the Catalog of Theses and Dissertations of the *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (CAPES), however, there is no review study among the published literature on the subject. Given the above, the motivation for the development of this study arose, aiming to describe and analyze the scientific production on Health Care Networks.

Methods

An integrative literature review was performed, regarding the production of knowledge on the Health Care Network public policy. We worked systematically with the research and analysis of the scientific material already produced, allowing the elaboration of syntheses from the several published studies, enabling general conclusions regarding a particular topic under study¹⁶.

The review was performed in six distinct phases: 1) establishing the topic/review problem and elaborating the guiding question; 2) selecting the articles (establishing descriptors and the inclusion/exclusion criteria for the publications); 3) categorizing the studies and defining the infor-

mation to be extracted from the reviewed studies; 4) analyzing the selected studies; 5) interpreting and discussing the results; 6) synthesizing the knowledge evidenced in the analyzed articles¹⁷.

To elaborate this integrative review, first, the central research question was defined: what is the content of the scientific production published in journals regarding the Brazilian public policy of Health Care Networks? To identify the publications that composed the integrative review of this investigation, we surveyed the Virtual Health Library: Latin American and Caribbean Health Sciences Literature (LILACS), the Scientific Electronic Library Online (SciELO) and the Medical Literature Analysis and Retrieval System Online (MEDLINE), in July 2019. To this end, the descriptors used were the expression “Health Care Network” and its counterparts in Portuguese “*Rede de Atenção à Saúde*” and Spanish “*Red Integrada de Servicios de Salud*”.

After excluding duplicate articles, we proceeded to assess them by reading the titles and abstracts, having as inclusion criteria the characterization as research article and the thematic approach to RAS, not including studies on specific thematic networks. Through the full reading of the articles, we found the research corpus, excluding articles that did not directly address the topic of RAS, those that addressed experiences in networks of other countries and those that were not fully available.

In order to systematize the data, a pre-categorization was organized and a matrix was prepared containing the following information: title, year of publication, analytical category and objectives of the study. The following were proposed as analytical categories to organize the results: 1) Conceptual Studies; 2) Case Reports; 3) Implementation Analyses and 4) Evaluation Studies, according to the object, objective or methodology of each reviewed study.

The analysis was processed by the authors in meetings of the research group of the project *A Rede de Atenção às Urgências e a Produção Viva de Mapas de Cuidados* (The Emergency Care Network and the Live Production of Care Maps) financed by the *Conselho Nacional de Desenvolvimento Científico e Tecnológico* (CNPq), which uses the RAS and, more specifically, the Urgency and Emergency Network as study object. Key questions were formulated, based on the intensity of the “cores of meanings” identified in the corpus of the review transversely to the analytical pre-cat-

egorization. These questions were configured as thematic categories and were aimed to guide the discussion and elaboration of syntheses.

Results

The study allowed the analysis of 27 scientific articles published in national and international journals in the field of Collective Health between 2010 and 2019, on the topic of Health Care Networks. The partial results of each stage of the article selection process are described as shown in Figure 1.

Regarding the year of publication, in 2017, we observed the largest number of studies, seven articles, followed by years 2015 and 2018, with six articles each. In 2010, 2011, 2013 and 2019, only one article published per year was found. Regarding the focus of the publications on RAS, an analytical pre-categorization was proposed to organize the results, described below, and is shown in detail in Charts 1 to 4.

The first category consisted of six articles that address in more depth the concept of RAS (Chart 1). Among these articles, we found an international publication that address the “Integrated Health Service Networks”¹⁸, the precursor concept of the RAS, and also an article by Mendes⁶, considered an important theoretical reference for Health Care Networks in Brazil. It is worth mentioning that one of the publications show the concept of Living Networks¹⁹, which emerges in scientific production as another rationality on health networks.

In relation to the second category, Case Reports, 8 articles were identified, described in Chart 2. It is worth highlighting that they show approaches ranging from local experiences of health care teams, from municipalities and health regions, and even a comparative study between the cities of Rio de Janeiro and Lisbon.

In the third category, there are nine articles that analyze the implementation of networks (Chart 3), including its challenges and strategies of integration, regionalization, communication, institutional and matrix support.

The fourth category, composed of four articles, deals with HCN evaluation studies (Chart 4), including the formulation of criteria, sanitary conditions of Health Services, the relation between local needs and interests and between the necessary and current organization.

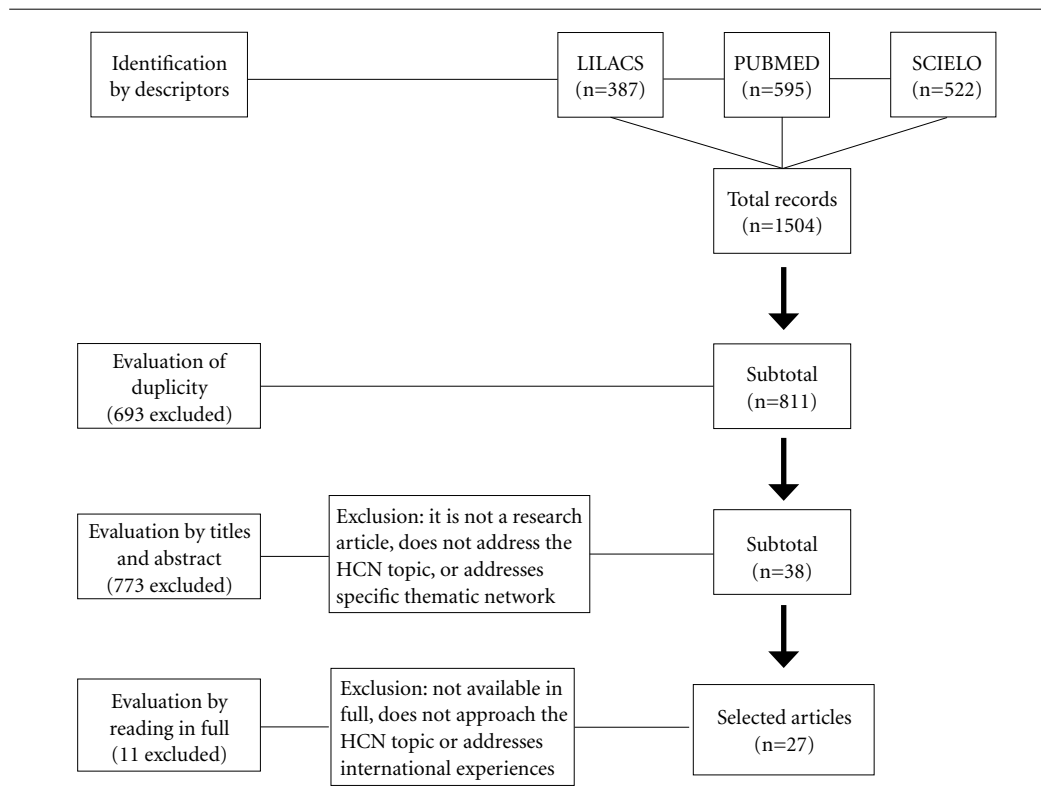


Figure 1. Flowchart of the selection process of the reviewed articles.

Source: Elaborated by the authors.

Chart 1. Distribution of articles in the category “Conceptual Studies,” according to title, year of publication and objectives. LILACS, SciELO, MEDLINE, 2019.

Category - Conceptual Studies		
Title	Year	Objectives
Health Care Networks	2010	To show a structured social response in integrated health systems: the health care networks
Integrated networks of health services: towards the construction of a concept	2012	The authors seek to understand the concept of network and its constituent elements, to define the conception of Integrated Health Service Networks
Live Networks: multiplicities turning beings, signals from the streets Implications for care production and the production of knowledge in health	2014	To synthesize the experiences gathered by a group of researchers affiliated with Labor Micropolitics and Health Care, from the Medical Clinic postgraduate school
Prospects for the region and networks in Brazilian health policy	2015	To analyze the prospects for the region and networks adopted in health policy in the period of 2001-2011
Health care networks under the light of the complexity theory	2015	To reflect on the framework of the Healthcare Networks under the light of the principles of Edgar Morin's Complexity Theory
Healthcare networks: trends of knowledge development in Brazil	2019	To analyze the trend of scientific production about Healthcare Networks in thesis and dissertations in Brazil

Source: Elaborated by the authors.

Chart 2. Distribution of articles in the category “Case Reports,” according to title, year of publication and objectives. LILACS, SciELO, MEDLINE, 2019.

Category - Case Reports		
Title	Year	Objectives
Primary healthcare and the construction of thematic health networks: what role can they play?	2012	To analyze the real possibilities (or limits or conditionings) for exercising this expanded responsibility placed on the PHC, examined from the findings of an ongoing investigation on the multiple logics of access and use of services
Primary Health Care: care coordinator in regionalized networks?	2016	To analyze the breadth of care coordination by Primary Health Care in three health regions
The role of Primary Healthcare in the coordination of Health Care Networks in Rio de Janeiro, Brazil, and Lisbon region, Portugal	2017	To comparatively analyze the organization of PHC, seeking to identify the advances in RAS coordination and in the management of chronic conditions
Health care networks implementation and regional governance challenges in the Legal Amazon Region: an analysis of the QualiSUS-Rede Project	2017	To analyze the potential, limits and challenges of regional governance in the implementation process of health care networks in three regions of the Amazon
Health care networking in cases of high complexity and high vulnerability: the experience of a Health Center	2017	To show and analyze the health care network formation processes around cases of high complexity and high vulnerability served by the Family Health Strategy at UBS, in the region of Brasilândia, in São Paulo, Brazil
Policy networks in metropolitan regions: the case of the health system in Brazil	2017	To discuss the case of Healthcare Networks in the Brazilian metropolitan regions, characterizing its process of implementation and identifying management problems in several cases, with the case of the Campinas Metropolitan Region being described in greater detail
Professionals as network producers: compositions and connections in health care	2017	To analyze, from the patient's centrality, how health professionals weave and produce the care network
Network care continuity and living network movements in user-guide paths	2018	To describe and analyze the meetings between actors of care production, that reflect in movements of living networks and potentiate the continuity of care and integrality

Source: Elaborated by the authors.

Discussion

The public policy of Health Care Network has been the subject of several studies, in which different methodological approaches and concepts are used. Understanding the concepts that underlie it, as well as the advances, limits and challenges of its implementation process, is imperative as a contribution to the improvement of SUS. In this review, the RAS model is formulated from a specific theoretical referential, but not unique, with influences from other fields of concepts and practices. As presuppositions of the proposed models, the centrality of primary care and the dependence of the health regionalization

process are evident. As a practice, the studies indicate competing or integrated actions of two fields that sometimes complement each other, sometimes oppose each other: the organization of networks for health care, with greater emphasis on the structure and definition of flows, and health care as a producer of networks, but more focused on the role of patients and health professionals.

To deepen the discussion, we used the following key questions: 1) the Health Care Network paradigm; 2) Primary health care as RAS coordinator; 3) Regionalization, networks and regional governance; 4) Network care; and 5) Challenges for RAS implementation.

Chart 3. Distribution of articles in the category “Implementation Analysis” according to title, year of publication and objectives. LILACS, SciELO, MEDLINE, 2019.

Category - Implementation Analyses		
Title	Year	Objectives
The organization of regional and integrated healthcare delivery systems: challenges facing Brazil's Unified Health System	2011	To analyze the current challenges facing Brazil's Unified Health System, in order to promote improved integration between services
Perception of managers of the Unified Health System about the challenges in the formation of Health Care Networks in Brazil	2013	To analyze the perceptions of managers about the challenges in the formation of Health Care Networks in Brazil
Contribution for the analysis of the implementation of Health Care Networks in SUS	2014	To analyze the implementation of Health Care Networks, with emphasis on health regions, stressing the importance of having local players with an adequate competence profile and involved in the implementation
The process of building up regional health management in the State of São Paulo: subsidies for analysis	2015	In order to discuss the COAP implementation process in some regions of São Paulo, this article provides support for understanding the regional health pact process in the state, verifying its potentialities and limits
A notion of the matricial practice to be rescued for the collaborative encounter between health teams and services in the SUS	2015	To revisit the original concept of matrix and analyze it in the light of the mathematical theory of matrix calculation and federal regulations
Thoughts on the development of active regional public health systems	2017	To analyze the complex process of health regionalization and the challenges arising from its implementation
Regionalization and Health Networks	2018	To reflect on the challenges faced in building the Health Regions and Networks in Brazil
Institutional Support according to the perspective of managers, supporters and workers: coming closer to reality from different places	2018	To analyze the senses and meanings that the Family Health (EqSF) teams, the administrators and supporters attribute to the work process of the municipal Institutional Support in two municipalities of Bahia
Communication Strategies of Municipal Health Secretariats: Challenges for Health Care Networks	2018	To describe health communication strategies in 19 municipalities in the state of Paraná

Source: Elaborated by the authors.

The Health Care Network paradigm

The conceptual RAS model was proposed as paradigm to the SUS organization in Brazil in the last decade and is adopted both by the Ministry of Health and by state and municipal health administrators as a public policy¹³. The publication by Mendes⁹, author who is an important reference to the topic, criticizes the hierarchical, fragmented systems, oriented to assist acute conditions, and defines the RAS as polyarchic organizations of health services sets, linked together by a single mission, by common objectives and by a cooperative and interdependent action, which allow to offer a continuous and integral care to a certain population, coordinated by primary health care – provided at the right time, place, with a

right quality and in a humanized way, and with health and economic responsibilities for this population. This concept was a beacon for RAS and the thematic networks that were subsequently agreed, at the discursive and normative levels, between SUS administrators within the Tripartite Interagency Commission, and subsequently embodied in the respective ordinances¹⁴. Arruda *et al.*²⁰, when analyzing the concept of RAS in the light of Complexity Theory, identified as its main characteristics: the formation of horizontal relations between the points of care, having a center of communication in primary care; the centrality of the health needs of a population; accountability for continuous and integral care; multi-professional care; and sharing objectives and commitments with health and economic results.

Chart 4. Distribution of articles in the category “Evaluation Studies,” according to title, year of publication and objectives. LILACS, SCIELO, MEDLINE, 2019.

Category - Evaluation Studies		
Title	Year	Objectives
Health Care Networks of Brazilian Unified Health System: 25 years of a fundamental contradiction between the Required Organization and the Current Organization	2014	To examine the contradiction between the necessary organization of the Health Care Networks of SUS in an integral and integrated way in the national territory, and the federative and municipal essence of its current organization, structurally fragmented and disintegrated
Care integration in a health region: a paradox between regional needs and local interests	2016	To identify and analyze the development of regional strategies for care integration in the context of health regions, with special focus on the role of Primary Health Care (PHC)
The care network and sanitary conditions of family health units: is there any relationship?	2016	To discuss the conceptions and operationalization strategies of the health care network, as well as the health conditions of family health units
Evaluation of health care coordination and health care networks ordination by Primary Health Care: a proposal of items for the evaluation of these attributes	2017	To propose a set of key elements that allow to assess the coordination of individual care and the role of organizing health care networks by the PHC, in order to compose in the future an instrument for evaluating networks

Source: Elaborated by the authors.

The formulation of the Health Care Network policy in Brazil has an important influence from the Integrated Health Service Networks, recommended by the PAHO, which presuppose care for a specific population, health services or establishment with different levels of care and complexity, and a territorial definition⁵. The central assumption in such definition is that the application of the concept of networks contributes for the articulation, interdependence and coordination of public, private and mixed actors, with the incorporation of specialized technologies expanding the access, also improving the connectivity in the health network and increasing its governance¹⁸. Even though, at the discursive level, health regions are considered as a space for planning RAS in the perspective of producing comprehensive care and articulating the set of intersectoral public policies necessary for this, we wonder how such network concept is able to consider, on one hand, the great regional differences, the social-economic heterogeneous structure, and the demographic, nutritional and epidemiologic changes of an overpopulated country with continental dimensions such as Brazil, and, on the other hand, the micropolitical dynamic involved in the production of care, which seems to escape the assumptions that underlie the formulation of the network concept².

In this sense, in addition to the RAS paradigm, we identify the recent formulation of another conceptual model, that of Living Networks, defined by Merhy et al.¹⁹ as a way of producing existential connections of individuals and collectives, in different contexts of group and social ways of living. In a study with user-guides, Hadad and Jorge²¹ identified living networks, produced in the act, in the encounter between professionals and patients from health needs, but also the lack of network, which impacted barriers that hinder access. Also, Maximino et al.²² observed wide care networks, operationalized in several ways and composed of multiple vectors and formal and informal elements, visible and invisible, objective and subjective, that contribute to facilitate or hinder the construction of articulation points between services, people and resources for care. According to Merhy et al.¹⁹, Living Networks are fragmentary and happening, hypertextually, that is, sometimes they are circumstantial, they assemble and disassemble, and sometimes become more stable, but they behave more like logics of digital networks, that may emerge at any point without having to obey a logical arrangement of analog networks, like a hypertext.

Thus, there are different conceptions of health networks that coexist and are interconnected, evidencing the need for studies that an-

alyze and deepen the relation between structure and action, norm and singular production, from the conceptual models of “Non-Network” (fragmentation), “Health Care Network” (systemic organization) and “Living Networks” (singular production), its possibilities and limits in the modeling of health systems and in the production of the way of caring.

Primary health as RAS coordinator

The RAS coordination by primary care emerges as a structuring condition of the model. For Mendes⁹, the communication center of health care networks is the interchanging node in which flows and counterflows of the health care system are coordinated, and it is constituted by primary health care.

Chueiria *et al.*²³ formulated a proposal for items to assess the coordination of RAS by primary care, composed of the following attributes: 1) primary care that covers the entire population; 2) is organized in multi-professional teams; 3) is the main gateway to the system; 4) is responsible for the coordination of care; 5) is resolute, being capable of solving the main health problems of its population. In a research developed by Peiter *et al.*¹⁵, in which they analyzed the trends of scientific production in postgraduate dissertations and theses in Brazil on RAS, the Primary Health Care (PHC) as coordinator of the network was the most studied among the analyzed categories.

Lapão *et al.*²⁴, in a comparative study, observed that historical, cultural, political and legal issues determine differences in PHC as a RAS coordinator in Rio de Janeiro and Lisbon: in Lisbon, the comprehensive PHC model is used, which has enough maturity in the coordination of its system, while Rio de Janeiro suffers historical remnants of a selective PHC. In Brazil, although the perception of administrators that the RAS should be based on the recognition of primary care as the body responsible for system planning and care coordination²⁵, these attributes still remain one of the main challenges for the organization of regionalized and integrated networks in SUS²⁶. Poorly mentioned in the meetings of the Regional Intergovernmental Commissions (RIC), the goal of setting up Health Care Networks, coordinated by primary care, is still a distant goal in view of the urgency of ensuring access to specialized and urgency/emergency hospital care in the health region, a topic that dominated the RIC discussions, with primary care being limited to municipal discussions²⁷.

Cecilio *et al.*²⁸ describe the following limits for primary care to assume the role of care coordinator: primary network is seen as a place for simple things, there is a powerlessness that is shared between patients and teams when it comes to the primary network functioning as care coordinator, indicating how it does not have material (technological, operational, organizational) and symbolic (values, meanings and representations) conditions to hold the central position in the coordination of thematic health networks. Also, the infrastructure conditions of Primary Healthcare Units, or their sanitary conditions, may interfere in the organization and offer of services provided, in the inefficiency of communication between the levels of care and in failures in the regulation process, generating, thus, problems for the RAS operationalization²⁹. In addition, as the system's preferred gateway, PHC faces a strong competition from hospital outpatient and emergency care services, disconnected from the network³⁰.

Thus, it is observed that the coordination by primary care is, at the same time, a premise and challenge for RAS, according to the scientific production evidenced in this review.

Regionalization, Networks and Regional Governance

The relation between the process of regionalization, regional governance and production of RAS has been recognized as interdependent, and it is an object of study in Brazil. To Mendes⁹, the governance of health care networks, in SUS, should be performed through interfederative arrangements, coherent with the cooperative federalism that is practiced in Brazil. The following inter-management commissions are materialized: at the national level, in the Tripartite Interagency Commission (CIT); in states, in the Bipartite Interagency Commissions (CIB); and in health regions, in the Regional Interagency Commissions (RIC).

Albuquerque and Viana³¹ identified three induction phases of the historical process of regionalization and organization of networks in Brazil, guided by different theoretical and political conceptions: normative region with regionalized and hierarchical networks (Health Care Operational Standard - NOAS 2001 and 2002); negotiated region with integrated and regionalized networks (Pact for Health - Ordinance 399/2006); and, region negotiated and contracted with health care networks (Ordinance 4,279/2010 and Decree 7,508/2011). Thus, the recent transition

from normative regions to negotiated regions and from hierarchical networks to integrated, regionalized and contractualized networks is evidenced.

The organization of regionalized networks in SUS depends on improving the interfederative administration in health regions in order to qualify the agreement of responsibilities between the government spheres³². Thus, strengthening governance and regional planning is subject to a deeper understanding of the context: identifying the causes of problems, the dynamics and power structure of organizations, determinants of patient behavior, as well as local actors, knowledgeable and able to implement the RAS³². To Shimizu²⁵, who investigated the perception of administrators on the challenges for the formation of RAS in Brazil, the operationalization of this process cannot follow prescriptive models, and requires investments that include the improvement of technical and political dimensions.

In the technical dimension, it points to the improvement of contractualization strategies to ensure the provision of health actions and services of different technological densities, as well as logistics to guide the user in the route of network meshes, regulation system, with clear norms and protocols to guide the access to the service network, to define competences and responsibilities²⁵. To Leite³³, the networks are implemented through Care Lines, in agreements with different actors for the construction of a strategic and investment planning, including structural changes, Permanent Education plans and qualification of regulatory processes. Gomes³⁴, in opposition to the ongoing decentralization process, even proposes the creation, at the federal level and national action, of a new legal entity exclusively focused on SUS, which is as convergent as possible for the necessary network organization, overcoming the political-administrative autonomy of local-regional administrators.

As for the political dimension, there are power disputes and conflicts at the regional level, including those formed by the private health service that requires strong regulatory mechanisms²⁵. To Mendes et al.³⁵, regionalization, more than a process of organizing the health actions and services of the territory, aiming at ensuring the integrality of care, is a political construction that must favor the dialogue between local actors and federated administrators in order to recognize and face the health needs of specific territories.

A study performed in the Amazon health regions, from the implementation of the QUAL-

ISUS-Rede project, observed that governance and integration were strengthened differently between the regions, depending on the capacity of direction and consensus among actors, making it difficult to overcome regional inequalities³⁶. Chioro dos Reis et al.², when proposing the construction of a Living Regionalization, indicated that this requires a strong investment of administrators so that the regional space may become a living and potent space of shared management. Without this, it will be reduced to a formal space, instituted by the standards and without power to implement a quality SUS in each region, capable of producing more life for all Brazilians.

Therefore, it is noticed that an intense process of co-administration and regional planning is essential for the implementation of the RAS, being the regional governance also constituted as a challenge, and its technical and political aspects should be observed beyond the Brazilian federative context.

Network Care

The networks formed in the health care process value the professional-patient encounter as producer of plots and connections, since they cause the construction of networks in greater or lesser power. These moments directly impact the outcome of care for cases²¹. Cecílio et al.²⁸, in a study on the role of primary care in thematic networks, reflect in the conclusion on the false image of harmony between care and a complex plot drawn by individuals in the singular composition of their care network.

To Maximino et al.²², formal networks coexist with informal ones, sometimes not recognized by professionals, pointing to the need to value the patient and their networks as protagonists seeking for support. According to Merhy et al.¹⁹, patients are Living Networks of themselves; they are all the time producing movements, elaborating knowledge, building and sharing care. Patients, most of the time, are the ones who ask for the networks, and the network is not given as a framework to be filled in a protocol way, because they are being woven in events. As for Arruda et al.²⁰, networks woven by patients are understood as an undesirable and dysfunctional situation: as an orchestra in which each instrument plays a different song, disharmony is installed, patients enter the system through all the doors and a labyrinth is formed with different paths to be taken and which often are not understood by them or by the professionals that are part of this complex process.

The need for investment to train workers for integral health practices that consider the patient as the protagonist of their care is highlighted by Hadad and Jorge²¹. To Nobre *et al.*³⁷, the formation of a network brings professionals closer to the territory, explores the potential of assistance and enables a more integrated approach, providing a more humanized service. In addition to a Permanent Health Education, other management arrangements may introduce these practices. The Institutional Support is a possibility of co-management, in an attempt to reduce noises, know the limits, respect the place of the other, to understand oneself, understand the others and build a work and care environment in a healthier and more pleasurable way³⁸. According to Medeiros³⁹, the Matrix Support may contribute to the integrality of care, and one must reject the rule producing models and crystallized positions to the detriment of the law liberating the elements and systems equated in the matrix team: a law that cannot be inscribed in a manual, since it must be written in each case to which the matrix is called, so that it fulfills its originally intended role.

Thus, the micropolitical dimension of work and health care is observed as a possibility for networks, another rationality to be considered, in which the role of the patient and the autonomy of health professionals can produce their own networks and maps of singular care based on health needs.

Challenges for the implementation of Health Care Networks

The challenges for implementing RAS were object of study of several investigations in the reviewed literature, evidencing several orders of challenges, including structural, functional and political.

An analysis of the health care systems, made from an international perspective, shows that they are fragmented, focused on the care of acute conditions and the acutization of chronic conditions⁹. In Brazil, the coordination capacity of networks is affected by fragmentation²⁷ and hinders the promotion of health as a social right by SUS²⁵. According to Arruda *et al.*²⁰, RAS, theoretically, are organized in increasing degrees of complexity, where the population should enjoy the various levels through coherent flows. However, in practice, this flow runs into a truncated, bureaucratic and disjointed functioning that does not consider the needs and real movements of

people within the system, which makes it slow and, in many cases, with unsatisfactory results.

The insufficiency of resources resulting from the low public investment in health is a structural problem for SUS and hinders the regional planning for organizing RAS^{20,26,33,35}. For Chioro dos Reis *et al.*², the commitment of the municipal budget with health beyond the mandatory minimum (15%) is harmful to the balanced management of cities. Low participation of states in financing is still observed, and the state resources in many scenarios have not been agreed with municipal administrators. Recent initiatives froze the federal public spending for two decades, pointing to the definitive infeasibility of SUS. Without the prospect of new resources, regional planning and programming become unfeasible.

Another structural challenge in Brazil is the policy for training health professionals. To Arruda *et al.*²⁰, there is an insufficient personal training policy for SUS, including quantitative and qualitative aspects. There is a need for training and education, with consequent availability of professionals for the public system²⁶ and the need to engage health workers and, specifically, doctors, as agents of change for the constitution of health regions and networks⁴⁰.

Among the operating challenges of the RAS, the need to overcome the limitations of some strategies is observed. For Leite *et al.*³³ there is a need for improving the information systems and failures in network monitoring and evaluation processes. As for Velho *et al.*⁴¹, they highlight the fragilities of the processes of communication: networks are weakly grounded and, despite the promotion programs and campaigns, there is still no process that provide measures capable of bringing information to the citizen, so that they assume the co-responsibility in the construction and conduct of SUS. For Chioro dos Reis *et al.*² the main challenges are planning and dimensioning the service network, the production of living networks of care, the regulation and the coordination capacity of the regional system. Viana *et al.*⁴⁰ indicate the need for an institutional leadership to be exercised by the states of the federation. For Mendes *et al.*³⁵, the state sphere of power still shows difficulties to assume the effective coordination of this process, restricting itself to the role of administrating the provision of its own services.

In the political dimension, the main challenges are in the relations between several actors that compose the territories where the RAS are built. To Albuquerque and Viana³¹, the models of ter-

ritorial organization of the health system and its combinations, in constant dispute within the federation, are conditioned by spatial dynamics and relations between state, market and society in the conduction of politics and health networks. Also, the electoral cycles, the inter-federative relations and the regional agreements are political processes that impact RAS². Mendes et al.³⁵ highlight the need for agreements to include several municipalities with greater socioeconomic, epidemiological, demographic and service offer difficulties, in order to strengthen the set of municipal administrators and to allow a greater coping of regional challenges; in addition, they emphasize that the weaknesses of the political-administrative construction of a Regional Management Collegiate make them more vulnerable to private interests at the expense of collective ones.

Final considerations

The scientific production on RAS is dense and includes conceptual researches, case reports, analyses of implementation strategies, addresses proposals of evaluation methods, and discusses the production of care in the network. There are also investigations on the challenges of RAS implementation, addressing different conceptions and thematic cutouts.

The conceptual model of Health Care Networks is shown as a new paradigm of organization for SUS, and seeks to reorient the system in order to ensure integrality and better health results. It is evident how the conceptual model impacts the perspective of shaping networks. In this model, primary care assumes a central role as coordinator of care and organizer of the system, which is both a premise and a challenge. There is a question here regarding how much this premise has helped in the actual shaping of the networks. Also, the regionalization and regional governance bring the interfederative relation as a bet and limitation, and its technical, political aspects and the way they are produced must be observed, including by the particularities of the federative structure in the Brazilian context. On the other hand, another conceptual and practical production is identified, the Living Network, in which the micropolitical dimension of work and health care are shown as a possibility for the networks. This is another rationality, showing a less functionalist network conception. Such conception brings

to the scenario the protagonist role of the patient and their relationship with the health worker, which may produce their own networks, based on health needs, forming rhizomatic networks.

In addition to the challenges of the regional governance, the underfunding, transformed now into a di-funding of SUS, to the established powers, the hegemonic care model and to the powers and limitations of primary care, the organizational modeling of SUS transitions between a fragmented system (chaos), polyarchic networks (organization) and the plots and connections produced in the care space (creativity). The differences between the various possibilities shown here do not seem to be a mere conceptual question or random choice by each actor. They indicate different paths.

Some limitations need to be mentioned at the end of this research. First, most of the reviewed studies was mostly based on qualitative methods, which, although they bring insights, concepts and theoretical-practical elaborations, expose little evidence production through numerical data and health indicators. In another direction, the focus on the investigation of a Brazilian public health policy, even if influenced by international experiences and models, establishes challenges regarding the comparison between national reality and the experiences of other countries. Consequently, the reviewed results should be interpreted with caution, considering the limitations of generalization and synthesis.

Finally, this integrative review point to two central questions, and not to a conclusion.

The first regards a theoretical-practical problem, since this question arises: how to overcome the fragmentation of care, ensuring integrality, composing the health care networks from distinct theoretical conceptions? That is, how to produce a SUS in a non-chaotic manner, which, when structuring formal networks, necessary for the management of the system and services, includes the living production of health care, based on the creative practices performed daily in face of the multiple and singular encounters between patients and health workers?

The second question, systemic and political, is: how can the production of care networks impact the inter-federative relations, the SUS financing process, the conformation of several types of health services, the population's access to the system and, centrally, the quality and power of health care processes?

Collaborations

LFN Tofani: collaborated in the elaboration and supervision of the project, in the collection and analysis of data, in the elaboration, writing and final revision of the article. A Chioro: collaborated in the elaboration and supervision of the project, in the data analysis, in the elaboration and final revision of the article. LAC Furtado: collaborated in the design and supervision of the project, data analysis, preparation and critical review of the article. R Andreazza: collaborated in the design and supervision of the project, data analysis, preparation and critical review of the article. CF Guimarães: collaborated in the design and supervision of the project and data analysis. DGCF Feliciano: collaborated in the collection, data analysis and review of the article. GR Silva: collaborated in data collection, analysis and review of the article. LM Bragagnolo: collaborated in the data analysis and review of the article.

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