Responses of the Brazilian health system to the emergency of the Zika virus: different strategies adopted by the states of Ceará and Rio de Janeiro

Mariana Vercesi de Albuquerque[1] (Orcid: 0000-0002-0763-6357) (mariana.vercesi@gmail.com)
Vera Lucia Edais Pepe[1] (Orcid: 0000-0003-0606-1544) (verapepe@ensp.fiocruz.br)
Lenice Gnocchi da Costa Reis[1] (Orcid: 0000-0001-5020-2469) (lenicereis@ensp.fiocruz.br)
Catia Veronica dos Santos Oliveira[1] (Orcid: 0000-0002-0464-1476) (catia.oliveira@ensp.fiocruz.br)
Aline de Araujo Gonçalves da Cunha[1] (Orcid: 0000-0003-0802-4165) (alineagcunha.rj@gmail.com)
Henrique Sant'Anna Dias[1] (Orcid: 0000-0003-3419-2496) (henriquesesrj@gmail.com)

[1] Escola Nacional de Saúde Pública Sergio Arouca, Fundação Oswaldo Cruz. Rio de Janeiro-RJ, Brazil.

Abstract: The article analyzes the cases of health system reprogramming in response to the Zika emergency in the states of Ceará (CE) and Rio de Janeiro (RJ), from 2015 to 2017. The research was anchored in the historical and institutionalist approach and the literature on regionalization and health care networks. It involved analyzing government documents and conducting interviews with key actors mobilized in the states' response to the epidemic. For each state, the following aspects were primarily explored: context, political-financial situation and health agenda at the time of the epidemic; and the design and implementation of responses (meanings, actors, resources, strategies and repercussions). The reprogramming of the health system in the states of CE and RJ presented different conditions and different meanings of actions, strategies, mobilized actors and developments, with a focus on care initiatives for children with Congenital Zika Virus Syndrome (SCZV). The importance of the regionalized and coordinated network was highlighted, with deconcentration of the offer of specialized services and early stimulation procedures; the coordinating and investing role of the state government; the qualification initiatives of health professionals; of the performance of research institutions in the service, production of knowledge and in the dialogue with affected families.

➤ **Keywords:** Access. Health System. Zika. Health Planning. Emergencies.

Received on: 8/26/2022 Revised on: 7/4/2023 Approved on: 8/1/2023

DOI: http://dx.doi.org/10.1590/S0103-7331202434SP106en

Editor: Jane Russo Reviewers: Gustavo Matta and Celita Rosário

Introduction

Brazil was the epicenter of the Zika virus (ZIKV) epidemic at the end of 2015, aggravated by the relationship between viral infection in pregnant women and the occurrence of cases of microcephaly (Araújo *et al*., 2016; Mlakar *et al*.; 2016; Teixeira *et al*., 2016) and congenital ZIKV syndrome (CSZV) in infants (Malta *et al*., 2017; Puccioni-Sohler *et al*., 2017). This scenario resulted in declarations of public health emergency of national importance (ESPIN), by the Ministry of Health (MH) (2015-2017), and international (ESPII), by the World Health Organization (WHO, 2016).

The most affected groups were women and children, especially poor, black and low-educated residents of the Northeast Region and metropolitan outskirts (Lesser; Kitron, 2016; Diniz, 2016). The health emergency highlighted the issue of reproductive health and the conflicts around the abortion agenda (Ventura; Camargo, 2016).

The response and reprogramming of health systems to face the epidemic involved the projection of new health care standards and needs; the definition of adequate research, technologies, financing and cooperation, including at an international level, and training; and union between managers, multilateral organizations, professionals, scientists and civil society (Barreto *et al*., 2016).

This process is influenced by international regulations and protocols on health emergencies (Ventura, 2016; Nunes; Pimenta, 2016; WHO, 2017) and by the different institutional capacities and forms of organization of health systems. In response to the crisis, strategies for coordinating the required reorganization of health actions and services are relevant, linked to the dimensioning of socioeconomic repercussions, focusing on vulnerable populations and places affected and/or at greater risk (Pepe *et al*., 2020).

In Brazil, the construction of the response to the ZIKV emergency took place amid a context of political and economic crises, with limitations in the additional contribution of financial resources to the proposed interventions; and was permeated by uncertainties about the disease and its consequences. This scenario led to the search for new knowledge and the incorporation of innovative forms of health practices and technologies (Pepe *et al*., 2020).

At the federal level, the response plan was structured into vector control initiatives and professional qualification actions. Integrated surveillance and health

care protocols guided the definition and notification of cases, the speeding up of diagnostic conclusions and the referral of babies and children to health care network services. One of the highlights was the intersectoral articulation between health and social assistance, expressing concerns about access to social benefits by the population (Garcia, 2018).

The operationalization of the response valued governance arrangements based on intergovernmental coordination, combining initiatives centralized in the federal government and actions carried out by subnational entities, induced through financial, logistical and information technology incentives (Garcia, 2018; Brasil, 2019).

Federal incentives to states and municipalities sought to consider the local and regional specificities of the Unified Health System (SUS) and inter-management agreements in formulating contingency actions for the health crisis and reprogramming health services. This perspective is based on the federative organization of the SUS, added to the variability of political-institutional capacities and the diversities and inequalities of the Brazilian territory.

With the end of the emergency, Zika lost space on the national health policy agenda. However, new cases are registered every year, 30% of which are pregnant women (Brasil, 2019). Highlights include the continued high incidence of microcephaly in some regions of the country and the continued need to monitor children diagnosed with SCZV (CONASEMS, 2022).

It is important, therefore, to understand how state responses were structured in the face of the ZIKV health emergency in Brazil, in light of the federal response and local SUS management arrangements, in repositioning the health care component. Identifying the aspects that favored or limited advances in the organization of the care network, as well as the similarities and dissimilarities between the different realities, constitutes learning around the challenges of preparing health systems for future emergencies.

The article aims to analyze the cases of reprogramming of the health system in response to the emergence of ZIKV in the states of Ceará (CE) and Rio de Janeiro (RJ), from 2015 to 2017. We sought to understand the conditions and meanings of actions, strategies, mobilized actors, developments and lessons learned from the state management of the health system, with a focus on care initiatives for children with SCZV (diagnosis, referral and rehabilitation services) in the states.

Method

The analysis was based on contributions from historical institutionalism (Thelen; Steinmo, 1992) and literature on regionalization and health care networks (HCN) (Viana *et al*., 2018). The set of initiatives formulated and implemented by state managers from RJ and CE were valued, within the scope of care for children affected by ZIKV, with emphasis on the political-institutional elements present in the response trajectories and the main characteristics of their health systems.

In the first analytical axis, the insertion contexts that informed the policy and the health system at the state level are highlighted, identifying the governmental agenda for (and associated with) the health sector; and the political-financial situation that was expressed during the period. The design and implementation of the responses comprised the second axis of the study, focusing on the identification of actors (organizations, instances and arenas); the resources mobilized (managerial, financial and structural); and the strategies adopted and their repercussions on the HCN (protocols, actions and services; strengths and weaknesses).

Key actors were interviewed – managers from the State Secretariat of Health (SSH) and the state government; university researchers; managers and professionals of care services for children with SCZV – 9 from Rio de Janeiro and 11 from Ceará. The interviews took place between November 2017 and August 2018, supported by a semi-structured script and recorded with authorization, for content transcription.

Complementarily, we used the analysis of government documents from the states, such as protocols, plans, normative acts, inter-management deliberations and institutional presentations, provided by the interviewees and/or available on the internet (Charts 1 and 2). This document comparison of the content of the interviews also involved the selection of news, to elucidate contextual aspects.

Chart 1. Documents that guided the responses of the state of Rio de Janeiro to the Zika virus health emergency – 2015-17

Year	Origin	Type	Summary
2015	State Secretariat of Health	SUS Planning Instrument - Report	Annual Management Report 2015, with justifications
2015	State Secretariat of Health	Resolution	Resolution SES n 1,296, November 18, 2015. Establishes immediate compulsory notification of pregnant women with exanthematous syndrome.
2016	SSH and Secretariat of Social Assistance and Human Rights	Technical Note	Joint Technical Note n. 001 SEASDH-RJ e SES-RJ, July 1, 2016. Intersectoral action to care for cases of microcephaly between the health and social assistance network.
2016	State Secretariat of Health	SUS Planning Instrument – Schedule	Annual Health Schedule SSH-RJ 2016
2015	State Secretariat of Health	SUS Planning Instrument - Report	Annual Management Report 2016, with justifications
2016	State Secretariat of Health. Superintendency of Specialized Care Control and Assessment	Institutional Presentation	Presentation of the State Meeting of the Care Network for People with Disabilities: structuring/reorganization in the context of Microcephaly. June 2016
2016	State Secretariat of Health Subsecretariat of Health Surveillance	Protocol	Assistance to pregnant women and newborns, possibly exposed to diseases transmitted by mosquitoes of the genus *Aedes* in the State of Rio de Janeiro (Protocol version 1.3).
2016	State Secretariat of Health Subsecretariat of Health Surveillance	Technical Note	Technical Note SVS/nº 02/2016. Provides that it is mandatory to send a notification form for pregnant women with rashes to undergo Zika Virus molecular biology tests at Lacen.
2017	State Secretariat of Health	SUS Planning Instrument - Schedule	Annual Health Schedule SSH-RJ 2017
2016	State Secretariat of Health	Others*	General assessment of the 2016 indicators correlated to the National Guidelines
2015	State Secretariat of Health	Others*	Considerations on RAG 2015

continue...

Year	Origin	Type	Summary
2016	State Secretariat of Health. Bipartite Intermanagers Commission. Council of Municipal Health Secretaries of Rio de Janeiro	Deliberation	Deliberation SES-RJ/COSEMS-RJ nº 23, February 18, 2016, which agrees to create a financial incentive for municipalities that demonstrate the carrying out of population mobilization actions on the State Prevention Day against *Aedes Aegypti*, established by the State Department of Health for 3/5/2016.
2016	State Secretariat of Health. Bipartite Intermanagers Commission.	Deliberation	Deliberation CIB-RJ nº 3,801, July 14, 2016. Agrees on actions to prevent and control arboviruses transmitted by Aedes Aegypti within the State of Rio de Janeiro.
2016	State Secretariat of Heath and Bipartite Intermanagers Commission.	Deliberation	Agrees on the creation of sentinel surveillance units for arboviruses.

* Others: institutional documents complementary to sectoral planning and management instruments at the state level.

Source: own elaboration.

Chart 2. Documents that guided the responses of the state of Ceará to the Zika virus health emergency – 2015-17

Year	Origin	Type	Summary
2016	Bipartite Intermanagers Commission of Ceará (BIC/CE)	Resolution	Resolution nº 35/2016 - CIB/CE. Agree on the selection of healthcare establishments: from the Fortaleza Macroregion (Matiniano de Alencar Hospital/Police Hospital and Albert Sabin Children's Hospital). From the North Macroregion (Policlínica de Sobral) and Macroregion Cariri (Policlínica de Barbalha), which will issue a detailed medical report on cases with a conclusive diagnosis of microcephaly in children from Ceará, as determined by Art 6 of Interministry Ordinance No. 405, of 15/03/ 2016. It agrees on the responsibilities of State and Municipal Health managers and the distribution of federal resources allocated to the State of Ceará through Interministry Ordinance nº 405, de 15/03/2-16

continue...

Year	Origin	Type	Summary
2016	Bipartite Intermanagers Commission of Ceará (BIC/CE)	Resolution	Resolution nº. 11/2016 – CIB/CE. Agrees to reformulate the State Plan for Structuring the Care Network for People with Disabilities in Ceará, with Early Stimulation Services becoming part of said Network. It agrees on the Early Stimulation Services of the establishments described below, which are responsible for offering care to children aged zero to 3 years with Delayed Neuropsychomotor Development Due to Microcephaly. Agree on criteria for establishing priorities for selecting early stimulation services to be funded with federal resources.
2017	Programa Mais Infância Ceará; State Secretariat of Health of Ceará; Early Treatment and Stimulation Center	Book	The experience of the State of Ceará in combating congenital Zika Virus syndrome
2016	State Secretariat of Health of Ceará; Health Promotion and Protection Coordination.	Protocol	Surveillance and Response Protocol to the Occurrence of Microcephaly and/or Central Nervous System Changes Related to Congenital Infections - Version 3 (April 2016)
2019	State Government of Ceará	E-book	Mais Infância Program, Ceará
2022	State Secretariat of Education of Ceará	E-book	Mais Infância Program, Ceará: from program to policy

Source: own elaboration.

The choice of states was based on criteria of similarity of cases in terms of risk and vulnerability to the epidemic. In RJ and CE, confirmed cases of children with SCZV were concentrated in poorer and more vulnerable regions in the capital, the metropolitan region and the inland (Goya, 2017; Peiter *et al*., 2020). In 2015, 67% and 68% of births had reached an adequate number of prenatal consultations, respectively in CE and RJ, close to the national average (66.5%) (Sinasc, 2015). The supply and production of medium and high complexity was concentrated in the capitals, and of the total outpatient production of medium complexity (which includes rehabilitation actions or early stimulation for children with SCZV), more than half was in the health regions that cover the capital (54.4% in RJ and 52.5% in CE) (SAI/SUS, DATASUS/MH, 2015-16).

On the other hand, the option for both cases considered the differences in terms of the regional organization of the health system and the performance and coordination capacity of the state health secretariats at the time of the epidemic. The states differed in terms of the degree of organization and institutionality of health regionalization and the capacity to act and coordinate the SES, highlighting a more critical and unstable situation in RJ and more favorable and stable in CE (Goya, 2017; Cunha, 2019).

The results originate from the joint interpretation of all study sources, correlating the proposed analytical axes. They are presented considering the chronology of the events that marked the response trajectory for each state. In the discussion, in light of the adopted framework and related literature, a critical reflection of the findings from a comparative perspective was prepared, indicating potentials and opportunities arising from the experiences analyzed.

The research work was approved by the Ethics Committee of the academic institution involved under Opinion No. 2,180,892 and CAAE 67311617.8.0000.5240.

Results

The case of Rio de Janeiro

Coping with the Zika virus emergency in the state of Rio de Janeiro occurred in a context of political crisis, with allegations of fraud and corruption in the state government, which culminated in the arrest of the then governor, in November 2018. The economic and financial scenario indicated a worsening in debt indicators with the Union and the fiscal situation, resulting in the unavailability of financial resources to honor commitments, including civil servants' payroll, and make new investments. This panorama led to the declaration of a public calamity within the scope of the state's financial administration, in June 2016.

Before that, in December 2015, a state of emergency was declared in the state health system, marked by the closure of state emergency hospital services and private and contracted beds. In the midst of the crisis, the state health secretary was changed, followed by measures to review contracts with social organizations that managed state health units. In addition to the reduction in the supply of services in the HCN, co-financing and support policies for municipalities were discontinued, adding uncertainty to the fight against the ZIKV health emergency.

The adverse situation challenged the Rio de Janeiro State Secretariat of Health (SSH-RJ), weakened in its role as financier, regulator, provider and coordinator of the health system, considering the repercussions of Zika. At the same time, it worked to contain the crisis in its network and prepare for mass events, intensified by the proximity of the Rio Olympic Games in mid-2016 (Miranda *et al*., 2017). According to the interviews, preparatory actions in the field of epidemiological surveillance and the reconfiguration of the care network for the Olympic Games were not very sensitive to the timely identification and contingency of the health emergency.

On the other hand, the accumulation of experience of SSH-RJ in confronting dengue epidemics and in discussions about the regional organization of the Maternal and Child Care Network, relatively organized and deconcentrated, opened up opportunities for the definition of surveillance protocols and services and existing beds to care for pregnant women and babies.

The Care Network for People with Disabilities (CNPD) had an incipient structure, marked by regional inequalities in the supply and production of neurology, ophthalmology and physical rehabilitation services. At that time, sixteen rehabilitation services, public and private, contracted at the CNPD were indicated, which, although present in different regional centers, those with the greatest structure and complexity to serve the SCZV were found in the capital and the metropolitan region.

Seven days after the declaration of ESPIN by the MH, the SSH determined compulsory notification within 24 hours to the Center for Strategic Information in Health Surveillance (CSIHS) of cases of pregnant women with exanthematous manifestation, with the aim of obtaining information that would support the preparation of a surveillance protocol for these women. In a similar sense, the compulsory and immediate nature was also adopted, in June 2016, for notifications of patients with neurological conditions associated with previous zika infection.

State situation rooms were organized, and the creation of similar municipal bodies was encouraged, with a focus on vector control, under the coordination of the state Civil Defense in conjunction with the SSH-RJ Health Surveillance Subsecretariat; and another focused on strategies for investigating and confirming suspected reported cases of microcephaly, and follow-up in the health care and social service network. This process was the responsibility of the SSH Primary Care Superintendency, in addition to other sectors of the secretariat, Cosems-RJ,

consultants and decentralized supporters of the MH. The State Secretariat for Social Assistance and Human Rights (SEASDH-RJ) has emerged as a relevant actor for intersectoral actions to support those affected in accessing social benefits.

Within the scope of the federal government's Rapid Action Strategy (RAS), the financial resources transferred were allocated primarily to the State Brain Institute (SBI), located in the capital, for the complementary offer of imaging exams, regulated by the SES, aiming at the diagnosis of babies with suspected intrauterine and postnatal microcephaly. Another allocation involved agreeing the remaining amounts with the municipal health secretariats, considering the proportionality of the incidence of cases in each municipality, to cover the cost of transporting families and children to the SBI and other diagnostic support actions carried out in the municipalities.

The design of the strategy advocated the decentralized action of primary care in the municipalities in referring babies and children to the specialized early stimulation and rehabilitation services available, after the actions to intensify diagnoses by the RAS. The regulation of access to the care network at the regional and state level was not expressed as a priority initiative, and the SSH, through regional Primary Care support teams, was responsible for actions to encourage the continued active search for pregnant women and babies affected by ZIKV.

The availability of the SBI in the response plan had the effect of speeding up the confirmation of cases, but with obstacles in coverage and coordination with other points in the network in offering exams. Furthermore, after the diagnosis, the search for specialized care and follow-up, via primary care in the municipality, highlighted problems such as long waits and referral to a service far from the patient's home, with losses to the routine of multiple care necessary for children with SCZV. The weak organization of the CNPD contributed to the state's low capacity to coordinate access and assistance flows.

Initiatives were implemented in the field of child health care, involving professional qualification courses, in partnership with universities and reference centers, such as the Fernandes Figueira Institute (FFI/Fiocruz), and the holding of events and debates focusing on Zika, proposed and with the participation of SSH-RJ Primary Care. The production of plans and protocols by the SSH expressed concerns regarding surveillance-care articulation, with a certain sensitivity in detecting new knowledge about the syndromic nature of Zika infection and subsequently expanding the

scope of actions to other pathogens of relevance in intrauterine infections: syphilis, toxoplasmosis, rubella, cytomegalovirus and herpes (STORCH).

In this sense, in light of a new federal strategy aimed at strengthening the care of children with suspected or confirmed SCZV and STORCH, a strategic plan was approved by the Bipartite Intermanagers Commission (BIC), published in 2018, and the formation of a State Management Committee (SMC), which expanded the representation of SSH sectors and incorporated other institutions, governmental and non-governmental, in coordinating the plan. Associated with the SMC, a state technical committee was created, aiming to operationalize proposals and coordinate with technical areas of the SSH.

In addition to the definitions surrounding the agreement on federal resources, for actions to qualify the diagnosis and comprehensive care of children, and the qualification incentives for the Family Health Support Centers (NASF), as a point of attention in Primary Health Care (PHC) for early stimulation, Rio de Janeiro's strategic plan, decided on the priority of regional organization of the CNPD, with care guidelines for care for both children with SCZV and STORCH, providing an expansion of the profile of children with priority care.

Interviewees highlighted that, although there has been flexibility in the Ministry of Health to enable rehabilitation services and NASF teams, with a focus on early stimulation of children with SCZV, this has not materialized, in a timely manner, in an effective increase in the coverage of these services in the state. The direct enablement of services made it possible to send financial incentives, but without any consequences in terms of qualifying the point of attention of the HCN, highlighting its late nature in the context of the response.

Gaps in state articulation and coordination of the network resulted in demands flowing to federal research and health care institutes, such as FFI/Fiocruz and the Institute of Child Care and Pediatrics Martagão Gesteira, of the Federal University of Rio de Janeiro (ICCMG/UFRJ), mobilized from the beginning to respond to the emergency. Through resources from research projects, care for pregnant women and babies was provided, with follow-up from prenatal care to neonatal and postnatal care, in addition to diagnosis.

Initially, this assistance flow was organized in parallel with the HCN dynamics, defined in the bodies responsible for designing the response in the state. As a result, the search for care in these institutes, and also in the Sarah Network hospital,

contributed to the duplication of links to services and fragmentation of the necessary comprehensive care. Subsequently, attempts at referral for long-term follow-up by primary care in the patients' municipalities, as established in the plan, came up against known barriers: concentration of specialized services in the capital and reduced regional governance of the network.

According to those interviewed, the PHC services in the municipalities had limited resolution in meeting the care needs of children affected by SCZV, which forced patients linked to the cohort studies of these institutions to remain, at the request of the families. This issue also expressed the demands for preparation and qualification of health professionals in the municipalities, which relied on initiatives led by FFI/Fiocruz.

FFI/Fiocruz was relevant in qualifying network professionals in the management of SCZV, through the Healthy Brasileirinhas and Brasileirinhos Strategy (EBBS), together with the General Coordination of Child Health and Breastfeeding of the Ministry of Health (GCCHB/MH) and the SSH Basic Care Superintendence. Federal services also established a direct dialogue with the mothers' movements, highlighting the struggle for access to services, medicines and technologies that were available in the SUS, given the obstacles they faced. It also made it possible to approach the Commission for Persons with Disabilities of the Legislative Assembly of the State of Rio de Janeiro (ALERJ), aiming to build a state public policy for care for children with SCZV.

The case of Ceará

Coping with the emergence of ZIKV in Ceará took place in a political context marked by stability and continuity of government management and a financial situation that enabled an agenda focused on the formulation of strategic projects in the social area. In August 2015, the Ceará government had launched the Mais Infância Program (MIP Ceará) led by the first lady and with the involvement of ten secretariats, represented on the Child Development Policy Advisory Committee.

MIP Ceará involved training in child development for public health, education and social assistance agents, and was heavily disseminated among managers and professionals in the state's municipalities. Its design received contributions from representatives of the three spheres of government, universities and community associations, in addition to the United Nations Children's Fund (Unicef) and

the World Bank, institutions that had been supporting Ceará in initiatives aimed at early childhood.

A priority action of the Program consisted of offering a minimum income to children and families in extreme poverty, registered with CadÚnico, without access to daycare and in precarious housing. This strategy included a prior mapping of municipalities with families in situations of greater social vulnerability, for distribution of the Mais Infância Card. In health, MIP developed actions aimed at qualifying community health agents and nurses in the Family Health Strategy.

At the Ceará State Secretariat of Health (SSH-CE), there was a context of strengthening and modernizing management, with a focus on regionalization policy. The aim was to consolidate the role of state management, with an expansion in the governance of Health Care Networks, with one of the strategies being the implementation of regional care services (specialty polyclinics), managed by vertical public health consortiums (in which the SSH-CE is a consortium entity).

In October 2015, the identification of the first cases of SCZV mobilized the state government to create a crisis committee, made up of professionals from care services and epidemiological surveillance, as well as representatives from SSH-CE management and Unicef's participation. One of the first actions involved the organization of a routine detection of suspected cases of microcephaly, through joint efforts, to establish a surveillance protocol and assistance actions for babies and children.

Adherence to the federal government's RAS was linked to these initiatives, with deliberation in CIB regarding the sharing of federal resources transferred to the state. Concentrating most of the resources, in addition to its own resources allocated to the actions, SSH-CE assumed responsibility for offering exams and professionals to provide care in its polyclinics, with the municipalities being responsible for guaranteeing the provision of health transport and financial assistance for the families.

Four reference services were agreed and selected for actions to confirm the diagnosis and issue the report required for access to social benefits: two hospitals in the Macro-region of Fortaleza (located in the capital) and two polyclinics in the macro-regions North (municipality of Sobral) and Cariri (municipality of Barbalha). In response to discussions surrounding the need for long-term monitoring of children to identify all possible consequences of Zika, Ceará adopted a broad concept of detecting delays in neonatal and child development, beyond microcephaly or other apparent deficiencies.

Reception in social assistance services aimed to speed up the receipt of benefits to which children and families were entitled, and to support situations where families refused to participate in joint efforts. This process involved coordination between the SSH and the Social Assistance Reference Centers (SARC).

Regarding post-diagnostic elucidation referral, a scheduling dynamic was established with pediatricians, neuropediatricians and speech therapists, initially in five polyclinics focusing on early stimulation. There was a concern about decentralizing actions to health regions further away from Fortaleza, with a smaller supply of diagnostic and specialized services in the care of multiple disabilities, and with a greater number of cases. The aim was to consolidate a more lasting strategy for monitoring children (0-3 years old) over time, especially in the most affected regions with fewer resources.

SSH-CE took a leading role in this process, expressed in the decision to deconcentrate early stimulation care, using the structure and team of professionals from its 19 regional polyclinics, with the aim of reducing distances and the pilgrimage of mothers and family members in search of the various types of care that their children needed on a daily basis. These services were agreed as a reference in the context of the reformulation of the State Plan for Structuring the Care Network for People with Disabilities in Ceará and were prioritized for access to federal funding resources that might be transferred by the Ministry of Health.

The expertise of the Center for Treatment and Early Stimulation of the Federal University of Ceará (Nutep/UFC), a reference service in the care of multiple disabilities and the development of assistive technologies, was used to propose the organization of Centers for Early Stimulation (CES) in regional polyclinics of SSH-CE, including the training of professionals, in conjunction with MIP Ceará, in the figure of the first lady, who made it possible to formalize a partnership between Nutep/UFC and the government of Ceará.

The agreement enabled the rapid implementation of training courses for multidisciplinary teams hired to work in the polyclinics' CES, as early as February 2016. Concern about the deconcentration of supply to regions further away from the capital was expressed at the beginning of the implementation of the centers by the polyclinic located in the municipality of Barbalha, a remote region that had a significant number of SCZV cases. The participation of Nutep/UFC, with consultancy visits, made it possible to accommodate demands for structural

adaptations in polyclinic spaces, favoring, among others, the use of assistive technologies, also provided within the scope of the partnership.

The CES were part of the Mais Infância Ceará Program, with its implementation financed with resources allocated from the SSH's own budget, guaranteed funding contributions in the aforementioned scale of prioritization of the use of federal resources, agreed upon by the IBC. The operation of polyclinics, under the responsibility of public health consortia, with SSH-CE as a consortium entity, also highlights the strategic nature of the state response in Ceará.

The hiring of teams, carried out through public selection by consortia, made it possible to deconcentrate services in the regions, providing professionals in more vulnerable and less attractive locations, despite the scarcity of doctors, especially neuropediatricians, as a limiting factor for strategy expansion and consolidation actions. According to those interviewed, the consortium management model enabled increased support for families through the CES, with investments in mini-kitchens, toy libraries and breastfeeding spaces in some health regions.

A regional governance strategy adopted involved recording the monitoring of care and the number and profile of CES professionals by health region and SSH bodies. The aim was to ensure the continuity and quality of actions, indicating demands for more training and qualification of professionals, new hires and services; and establish a cohesive relationship between municipal managers in different regions.

Respondents raised concerns about the follow-up of children after the age range for monitoring early stimulation devices (0-3 years), within the scope of the CNPD. SSH-CE encouraged regional discussions in this regard, also taking advantage of the federal incentives that were established from 2017 onwards. As a result, the Program for Attention to People with Disabilities was established (2020), covering ongoing education initiatives for professionals from the Center for Family Health Support (NASF) and dialogue with education departments to identify delays in children's development.

This process was also marked by actions to diagnose service needs and map CNPD services to be structured, accredited or strengthened, from the perspective of comprehensive care. Another development consisted of the elaboration of a project linked to the CNPD and the CES, called "Accessible Ceará", which aimed to expand the production of assistive technologies and their distribution in the regional network.

The coordinated action between MIP Ceará, SSH-CE and Nutep/UFC provided an opportunity to approach and dialogue with the mothers and families of children affected by SCZV, during the joint efforts and in the CES. The demands presented guided the training of professionals, the organization of service offerings and the materials used. Nutep/UFC offered training and materials for families to continue early stimulation at home. Home care for children with SCZV found limits due to the unavailability of professionals and various weaknesses in supporting the stimulation of the NASF, despite federal incentives for this.

Discussion

The reprogramming of the health system in the states of CE and RJ presented different conditions and different directions of actions, strategies, mobilized actors and developments, with a focus on care initiatives for children with SCZV. The coordination of the Ministry of Health, with guidelines, regulations and resources, to combat the Zika epidemic made all the difference. However, at that time, the unfavorable political-financial situation for RJ and more favorable for the CE, as well as the different perspectives of state health agendas and organization of health systems, conditioned the guidelines and strategies of state action plans for ZIKV.

CE relied on the strategy of regionalization, primary care and community health agents that were strongly institutionalized over time. To combat Zika, the state government prioritized decentralization, deconcentration and capacity for regional coordination of actions, resources and services, taking advantage of the previous existence of the Mais Infância Program and the Public Health Consortia. Also noteworthy is the priority given to children in scope of state policy, within an intersectoral program, with a global perspective on its development and on tackling regional inequalities. The implementation of CES in regional Polyclinics providing rehabilitation services (various specialties) for children diagnosed with SCZV (multiple disabilities) resulted in the rapid regional deconcentration of investments, services, teams and early stimulation procedures in the state. This greatly facilitated access for children with SCZV (Batista *et al*., 2020). There was great agility in the implementation of the CES, with transport support from the municipalities to guarantee weekly travel and care for children in their health regions (Goya, 2017).

In the case of RJ, there was no initial guideline to regionally deconcentrate diagnostic and early stimulation services for children affected by SCZV. The

difficulties in regional health planning express the historical fragility of SES coordination, the large concentration of the service network in the capital and the complexity of providers (including the federal one) (Ugá *et al*., 2010). SCZV cases were concentrated in the capital and metropolitan region, as well as specialized and rehabilitation services (Peiter *et al*., 2020). The option of concentrating the diagnosis of suspected cases of SCZV in the capital and then forwarding them through primary care in the municipalities resulted in insufficient resources, equipment, lack of care coordination and difficulties in accessing specialized services and commuting on a daily basis. of families (Cunha, 2019). Initially, some municipalities did not have the resources to transport families to the capital for diagnostic confirmation.

Access was inadequate and fragmented across several services, with a lack of coordination and communication across the network (Albuquerque *et al*., 2019). The weak role of SSH in planning and regulating assistance, including difficulties in obtaining information from municipalities, resulted in federal institutes taking a leading role in coordinating the network for SCZV care (Cunha, 2019). In fact, working with the Ministry of Health in the production and dissemination of support materials for families and health professionals to improve care for children (Fiocruz, 2018). Alerj and the Public Ministry played a fundamental role in encouraging improvements in the state response to affected families (Santos, 2019).

In Brazil, the importance of a regionalized network for caring for children with SCZV and reducing social inequalities was highlighted (Oliveira *et al*., 2021). The regional deconcentration of the provision of specialized services and early stimulation procedures in the country, since 2016, was crucial to facilitate access for the population, with emphasis on Northeastern states (Brazil, 2019). In addition to state actions, the federal incentive to expand the offer of early stimulation in all services, especially in PHC, was fundamental, through regulatory changes for payment for procedures (Brasil, 2016). In some regions, there was increasing participation of small municipalities in offering early stimulation through primary care (Barbosa, 2022). In the two states analyzed, it is necessary to invest in PHC to qualify and expand early stimulation and rehabilitation services, further facilitating access by families and children (Goya, 2017; Peiter *et al*.; 2020; Batista *et al*., 2020) .

Zika gave visibility to people with disabilities and made it urgent to organize the CNPD in the states, to improve access and continue care. RJ had a State Conducting Group to organize the RCDP, since 2013, and had some rehabilitation services in

its health regions, most of them in the capital, but faced difficulties in regional coordination and expansion of network services (Governo RJ, 2020). Some services were enabled to care for SCZV and rehabilitation, in a direct relationship with the Ministry of Health, without coordination by regional plans of the care network. RJ did not reverse the high concentration of services in the metropolitan region, especially in the capital (Peiter *et al*., 2020). In Ceará, the CNPD was incipient and was not well structured and organized. The response to Zika recently boosted the discussion and formulation of the implementation of the regionalized CNPD in the state (Governo CE, 2021). The flexibility of qualifications at the national level has not guaranteed the support of regional networks, which face an insufficiency of qualified and trained professionals, resulting in rotation and loss of services and links.

It is important to highlight that the states analyzed adhered to the MS guidelines to speed up the diagnosis of SCZV and facilitate families' access to the Continuous Payment Benefit (CPB). This was fundamental, as the affected families were concentrated in poorer and more unequal regions (Goya, 2017; Peiter *et al*.; 2020). The CPB depended on coordination with Social Assistance. Another essential link is with Education, daycare centers and schools are not always prepared to receive children with SCZV. The complexity of diagnoses and the evolution of SCZV cases have produced increasing demands in different sectors. The answers depend on the integration of social protection strategies and actions.

Decision-making by the State Government was the crucial factor in Ceará's ability to quickly structure responses to the Zika epidemic, with a clear focus and priority, in a critical context of uncertainty regarding the consequences of Zika, reducing investments in health by the Federal Government, poverty and lack of health resources in several regions of the state. This capacity of Ceará can be attributed, among other things, to adopted and prioritized pre-epidemic actions, the political and financial stability of the state government in recent years to structure programs and investments, in addition to the partnership with the University. Another important condition for structuring Ceará's response was listening and exchanging information about demands and needs with professionals, health units, managers and mothers of children affected by SCZV. In Ceará, there was a closer dialogue between families and the secretariatts and not just with the services. Training actions involved professionals and families (guidance for early home stimulation).

In RJ, training actions took longer to take place. The lack of dialogue between state management and mothers and their organizations for decision-making made quick and effective actions difficult in every way. The closest dialogue took place with the main federal reference services for the care of children with SCZV, which later, together with the Ministry of Health, trained municipal professionals and families. Institutions of excellence expanded their training actions, including using the FFI/Fiocruz virtual platform (Booklets and distance learning).

Final considerations

Given the repercussions and uncertainties produced by the Zika epidemic in Brazil, state experiences brought extremely important lessons, which need to be considered for future emergencies, to strengthen social protection in health and the SUS. The priority direction of responses to health emergencies must be to confront inequalities and focus on affected and vulnerable people, groups and regions.

Zika illuminated the demands of people with disabilities and made it urgent to organize the CNPD to meet them. Coordinated and deconcentrated actions and services within regions and health networks had better results in the Zika epidemic because they resulted in greater equity and adherence of policies and protocols to different realities.

The political-financial crisis and growing inequality have conditioned the maintenance of responses. At the same time, better results depend greatly on the actors mobilized, as well as on the dialogue, articulation and coordination between them. The dialogue between governments, scientists and health professionals with affected families was crucial for the convergence of knowledge, producing quick and effective responses in different places and regions. Intersectoral coordination is still timid, and depends on an integrated vision of social protection, with a focus on confronting inequalities and permanent dialogue with society.

Based on the cases analyzed and in conjunction with the studies already produced on the subject, ten central guidelines for responding to health emergencies and disasters are identified: 1) Prioritize the care of vulnerable populations, especially women and children, and regions of great inequality , who are at greater risk and worse conditions for prevention and health care; 2) Coordinate actions at different scales and regions, strengthening intergovernmental and intersectoral cooperation

and coordination and the integration between surveillance and health care; 3) Expand access (in-person or virtual) to necessary services, technologies and resources and adapt responses to different regional realities (decentralize, deconcentrate and diversify in a coordinated way); 4) Strengthen state and municipal health departments (resources, financing, qualification) to improve and enhance responses in a coordinated and regionalized manner; 5) Training health professionals and workers, as well as social groups at greatest risk: the best results depend on training, information and communication; 6) Promote the convergence of scientific, political/managerial and popular knowledge, through dialogue between governments, services, organized civil society and scientific institutions, enhancing the production of knowledge, technologies, strategies and appropriate, effective actions, with equity and quality; 7) Expand the use of information systems, artificial intelligence and digital platforms to guarantee service, training, information, action and dialogue; 8) Guide planning, health policies and the integration of social protection actions in the face of the long-term effects and consequences produced by health emergencies, to continuously serve the people and places affected; 9) Substantially increase SUS funding, to guarantee advances in health care, surveillance, education and science and technology; and 10) Guarantee the right to health and universal access, strengthening the SUS.[1]

Acknowedgements

This work was (partly) supported by the European Union's Horizon 2020 Research and Innovation Program under ZIKAlliance Grant Agreement no. 734548. The authors would like to thank the members and coordinators of the Social Sciences and Humanities Project in the face of the Zika Virus Epidemic in Brazil - Fiocruz.

References

ALBUQUERQUE, M. S. V. *et al.* Access to healthcare for children with Congenital Zika Syndrome in Brazil: perspectives of mothers and health professionals. *Health Policy Plan*, v. 34, p. 499-507, 2019.

ARAÚJO, T. V. B. *et al*. Association between Zika virus infection and microcephaly in Brazil, January to May, 2016: preliminary report of a case-control study. *Lancet Infectious Diseases*, v. 16, n. 12, p. 1356-1363, dez. 2016.

BARBOSA, R. C. *Análise espacial da oferta de estimulação precoce em crianças com Microcefalia, no Sistema Único de Saúde*: no contexto da epidemia de Zika. 2022. Dissertação (Mestrado em Políticas Públicas em Saúde) - Escola Fiocruz de Governo, Fundação Oswaldo Cruz, Brasília, 2022.

BARRETO, M. L. *et al.* Zika virus and microcephaly in Brazil: a scientific agenda. *The Lancet*, v. 387, p. 919-921, mar. 2016.

BATISTA, L. L. *et al.* Condições de vida e acesso às políticas sociais das famílias de crianças com Síndrome Congênita pelo vírus Zika atendidas em Fortaleza, Ceará, em dezembro de 2016. *Rev Med UFC*. Fortaleza, v. 60, n. 2, p. 5-10, abr./jun. 2020.

BRASIL. Ministério da Saúde. Secretaria de Vigilância em Saúde. *Síndrome congênita associada à infecção pelo vírus Zika. Situação Epidemiológica, Ações Desenvolvidas e Desafios de 2015 a 2019*. Boletim Epidemiológico. Brasília: Ministério da Saúde, 2019.

BRASIL. Portaria MS/SAS n. 355, de 8 de abril de 2016. Inclui o procedimento de estimulação precoce para desenvolvimento neuropsicomotor para atendimento na Atenção Básica na Tabela de Procedimentos, Medicamentos, Órteses, Próteses e Materiais Especiais do SUS. *Diário Oficial da República Federativa do Brasil*, Brasília/DF, 11 abr. 2016.

CONASEMS. *Dengue, zika e chikungunya tiveram aumento de casos no Brasil nos últimos meses*. 12 de maio de 2022. Available at: https://www.conasems.org.br/dengue-zika-e-chikungunya-tiveram-aumento-de-casos-registrados-no-brasil-nos-ultimos-meses/

CUNHA, A. *Entre vírus, políticas e gestores*: repercussões da epidemia de Zika e a atenção à saúde das crianças com a Síndrome Congênita do Zika Vírus. Dissertação (Mestrado em Mestrado em Saúde Pública) - Escola Nacional de Saúde Pública, Fundação Oswaldo Cruz, Rio de Janeiro, 2019.

DINIZ, D. Vírus Zika e mulheres. Cadernos de Saúde Pública. v. 32, n. 5, e00046316, 2016.

FUNDAÇÃO OSWALDO CRUZ. *Guia Prático de direitos para profissionais de saúde e famílias de crianças com a síndrome congênita do Zika vírus no Rio de Janeiro*. Rio de Janeiro: Instituto Nacional de Saúde da Mulher, da Criança e do Adolescente Fernandes Figueira, 2018, 52p.

GARCIA, L. P. *Epidemia do vírus Zika e microcefalia no Brasil*: emergência, evolução e enfrentamento. Brasília: IPEA, 2018.

GOVERNO DO ESTADO DO CEARÁ. *Plano Estadual da Rede de Cuidados à Pessoa com Deficiência* (CNPD) 2021-2023. Resolução CIB/Ceará nº 76, junho, 2021.

GOVERNO DO ESTADO DO RIO DE JANEIRO. *Plano Estadual da Rede de Cuidados à Pessoas com Deficiência*. CIB/RJ, novembro, 2020.

GOYA, N. *Regionalização da saúde*: cartografia dos modos de produção do cuidado e de gestão em saúde. 2017. Tese (Doutorado em Saúde Coletiva) - Universidade Federal do Ceará, Fortaleza, 2017.

LESSER, J.; KITRON, U. A geografia social do Zika no Brasil. *Estudos Avançados*. v.30, n. 88, p. 167-75, 2016.

MALTA, J. M. A. S. *et al.* Síndrome de Guillain-Barré e outras manifestações neurológicas possivelmente relacionadas à infecção pelo vírus Zika em municípios da Bahia, 2015. *Epidemiologia e Serviços de Saúde*, Brasília/DF, v. 26, n. 1, p. 09-18, jan-mar. 2017.

MIRANDA, E. *et al.* Organization of Health Services and Risk Preparedness during the 2016 Rio de Janeiro Olympic Games. *Prehospital and Disaster Medicine*, v. 32, S1, p. S138-S138, 2017.

MLAKAR, J. *et al.* Zika virus associated with microcephaly. *New England Journal of Medicine*, v. 374, n. 10, p. 951-958, mar. 2016.

NUNES, J.; PIMENTA, D. A epidemia de Zika e os limites da saúde global. *Lua Nova: Revista de Cultura e Política*, São Paulo, n. 98, p. 21-46, 2016.

OLIVEIRA, I. L. *et al.* Rede de Atenção do Sistema Único de Saúde (SUS) para enfrentamento da microcefalia por infecção materna pelo vírus Zika, em Feira de Santana, Bahia, 2015-2018. *Revista de Saúde Coletiva da UEFS*, [S. l.], v. 11, n. 2, p. e6047, 2021.

PEITER, P. *et al.* Análise de dimensões do acesso à saúde das crianças com Síndrome Congênita de Zika (SCZ) na Região Metropolitana do Rio de Janeiro. *Saúde e Sociedade*. 2020, v. 29, n. 2, e200064.

PEPE, V. L. E. *et al* Proposta de análise integrada de emergências em saúde pública por arboviroses - o caso do Zika vírus no Brasil. *Saúde em Debate*. Rio de Janeiro, v. 44, p. 69-83, 2020.

PUCCIONI-SOHLER, M. *et al*. Dengue infection in the nervous system: lessons learned for Zika and Chikungunya. *Arquivos de Neuro-Psiquiatria*, São Paulo, v. 75, n. 2, p. 123-126, fev. 2017.

SANTOS, C. R. *Acesso a bens e serviços relacionados às necessidades das crianças com síndrome congênita do Zika vírus*. 2019. Dissertação (Mestrado em Mestrado em Saúde Pública) - Escola Nacional de Saúde Pública, Fundação Oswaldo Cruz, Rio de Janeiro, 2019.

TEIXEIRA, M. G. *et al.* The Epidemic of Zika Virus-Related Microcephaly in Brazil: Detection, Control, Etiology, and Future Scenarios. *American Journal of Public Health*, v. 106, n. 4, p. 601-5, mar. 2016.

THELEN, K.; STEINMO S. Historical institutionalism in comparative politics. In: THELEN, K. *et al*. (Eds.). *Structuring Politics*: historical institutionalism in comparative analysis. Cambridge: Cambridge University Press, 1992. p. 1-32.

UGÁ, M. A. D. *et al.* (Orgs.). *A gestão do SUS no âmbito estadual*: o caso do Rio de Janeiro. Rio de Janeiro: Editora Fiocruz, 2010, 377p.

VENTURA, D. F. L. Do Ebola ao Zika: as emergências internacionais e a securitização da saúde global. *Cadernos de Saúde Pública*, Rio de Janeiro, v. 32, n. 4, 2016.

VENTURA, M.; CAMARGO, T. M. C. R. Direitos Reprodutivos e o Aborto: As mulheres na epidemia de Zika. *Revista Direito e Práxis*, v. 7, núm. 15, p. 622-651, 2016.

VIANA, A.L.D. *et al.* Regionalização e Redes de Saúde. *Ciência & Saúde Coletiva*, v. 23, n. 6, p. 1791-1798, 2018.

WORLD HEALTH ORGANIZATION. *Emergency response framework*. 2. ed. Geneva: WHO, 2017.

Note

[1] M. V. Albuquerque and H. S. Dias: conception of the article, draft preparation, critical review of the content and approval of the final version of the manuscript. V. L. E. Pepe, L. G. da C. Reis, C. V. dos S. Oliveira and A. de A. G. da Cunha: conception of the article, critical review of the content and approval of the final version of the manuscript.

Resumo

Respostas do sistema de saúde brasileiro à emergência do Zika vírus: as distintas estratégias adotadas pelos estados do Ceará e do Rio de Janeiro

O artigo analisa os casos de reprogramação do sistema de saúde em resposta à emergência de zika dos estados do Ceará (CE) e do Rio de Janeiro (RJ), no período de 2015 a 2017. A pesquisa ancorou-se na abordagem institucionalista histórica e na literatura sobre regionalização e redes de atenção à saúde. Envolveu a análise de documentos governamentais e a realização de entrevistas com atores-chave mobilizados na resposta dos estados à epidemia. Para cada estado, foram explorados, prioritariamente, os seguintes aspectos: contexto, conjuntura político-financeira e agenda da saúde no momento da epidemia; e o desenho e implementação das respostas (sentidos, atores, recursos, estratégias e repercussões). A reprogramação do sistema de saúde nos estados do CE e RJ apresentou distintas condições e diferentes sentidos das ações, estratégias, atores mobilizados e desdobramentos, com foco nas iniciativas de atenção às crianças com síndrome congênita do Zika vírus (SCZV). Evidenciou-se a importância: da rede regionalizada e coordenada, com desconcentração da oferta de serviços especializados e dos procedimentos de estimulação precoce; do papel coordenador e investidor do governo estadual; das iniciativas de qualificação dos profissionais de saúde; da atuação de instituições de pesquisa no atendimento, produção de conhecimento e no diálogo com famílias afetadas.

➤ **Palavras-chave:** Acesso. Sistemas de saúde. Zika. Planejamento em saúde. Emergências.