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Local Health Service Response to COVID-19 in Mexico: Notes From an Exploratory Qualitative Study

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Abstract

Background. The main goal of a health system is to maintain or improve people's health. The COVID-19 pandemic showed the fragility of health systems worldwide. In Mexico, the pandemic affected the performance of the health system, along with the presence of contextual conditions such as its segmentation and high prevalence of chronic diseases. *Aims.* To analyze from an approach to the functions of the health system, the service delivery, human resources, financing, and stewardship/governance in the local health services of five states of Mexico, from the perspective of the staff working in health centers. *Methods.* This is an exploratory qualitative study conducted from November 2020 to August 2021, involving 124 health professionals from 39 health facilities (18 rural and 21 urban). The technique used was the semi-structured interview. Interview guides were developed according to core topics. Subsequently, the thematic analysis method was used. *Results.* The lack of financial resources delayed prevention efforts and made it difficult for health centers to adapt to the crisis. Inequity was found in the distributive efficiency of staff between rural and urban areas and levels of care. In addition, there was evidence of capacity for coordination, capacity sharing, and joint participation between health institutions, civil authorities, and the population to face the emergency. *Conclusions.* We identified relevant public health actions that showed the capacity of local health services to organize a response to the pandemic at the level of the actors responsible for these services.

Keywords

Covid-19, health services, health personnel, health systems

The COVID-19 pandemic showed the fragility of health systems (HSs) worldwide (Organization for Economic Co-operation and Development [OECD], 2021). In Mexico, the performance of the HS was affected by several contextual conditions. First, its segmentation, which divides the population into several strata: Formal workers and their families receive care in social security institutions; the population without this benefit is served by the Ministry of Health, which coordinates care through state health secretariats in each of the 32 states that make up the country, in urban and rural areas (Sánchez et al., 2021); and finally, some people use private services. Second, the high prevalence of chronic non-communicable diseases (NCDs), which was associated with severe cases of COVID-19 and 76.5% excess mortality (Secretaría de Salud [Ministry of Health], 2022). Third, the shortage of health workers (Fundar, 2022).

The Mexican HS required structural adjustments to respond to the health emergency at all levels, including the delivery of health services across the sector. In this scenario, the population without social security was the most affected, mainly because of the structural limitations of state health secretariats to guarantee care for remote rural communities through local health services. Although there is an extensive bibliography on the impact of COVID-19 on Mexican health care, few studies have investigated the characteristics and relevance of the response of health services to this crisis from the perspective of its main social actors. They are the ones who can give an account on the differentiated conditions of public health care provision according to the sociocultural-geographical context

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in which they worked (Knaul et al., 2021; Pan American Health Organization [PAHO], 2021; Ramírez, 2020; Sanchez et al., 2021).

In 2000, the World Health Organization (WHO) defined HSs as "the resources, actors, and institutions related to the financing, regulation, and provision of health actions, whose primary intention is to improve or maintain health." (World Health Organization [WHO], 2000). They also recommended evaluating the performance of HSs based on their core functions, that is, service delivery, human resources, financing, and governance/stewardship. More than 20 years after the WHO laid out this conceptual framework, emphasis has been placed on permanent evaluation of HS functions by analyzing its sub-functions and objectives to determine the areas to be prioritized, guide policymaking, and manage resources (Papanicolas et al., 2022; Sacks et al., 2019; World Health Organization [WHO], 2007). Therefore, the goal of this article is to analyze, from an approach to the functions of the HS, the delivery of health services, human resource management, financing, and stewardship/governance in local health services of five states of Mexico during the COVID-19 pandemic. This analysis is grounded on the perspective of staff who worked in health centers of the first level of care belonging to local-state health services. The central questions to be answered were the following:

> 1. What were the characteristics of service provision? 2. How were human resources organized for the demand for COVID-19 care? 3. How did funding influenced service provision? and 4. What characterized the governance/stewardship of state health services during the COVID-19 pandemic?

Material and Method

Study Design and Population

The study had an exploratory design, seeking to expand knowledge about the health services response to the COVID-19 pandemic, which was occurring at the time of this research. A qualitative method, from the constructivist paradigm was used (Schwandt, 2000), following the classification of Guba and Lincoln (1994). The qualitative approach allowed the understanding of health personnel perspectives based on their experiences.

The study was conducted in local health services of five states of Mexico, understanding health service as the organization and management of health care carried out in each of the states of the country defined by a territorial delimitation. Considering the heterogeneity and great diversity of population and sociocultural contexts of the states of Mexico, as well as their environmental, orographic, and geographical differences, each local health service has its own infrastructure and human resources to provide care. They are organized into Health Jurisdictions (HJs) and health centers (HCs) operating in rural and urban areas. HCs vary in complexity depending on the amount of population served, infrastructure, and number of human resources. Health staff is mainly organized into teams made up of a general practitioner, one or two nurses, and a health promoter.

Sample Selection

The diversity of contexts and the implementation of innovative actions to face the pandemic were central topics of this study. State health authorities were contacted to explain the objectives of the study and invite them to participate. Five out of seven states agreed to collaborate: two in the north (North 1 and North 2), two in the south (South 1 and South 2), and one in the southeast region. After agreement with the health authorities, three HJs were selected in each state, for a total of 15. Next, a mapping of health professionals involved in resource management and direct care during the health emergency was done. To select the participants, the main criteria were considered as (a) participate in case detection, (b) develop prevention activities, (c) provide remote home care, and (d) refer COVID-19 cases. Thus, two service areas were selected: (i) planning and (ii) health care. Subsequently, the job profiles of participants that would be interviewed were intentionally chosen as follows: from the planning area, state directors, HJ directors, supervisors, and members of health brigades. From the area of health care, doctors, nurses, and health promoters. These profiles were cross-referenced with the two types of health facilities studied. Finally, 124 health professionals participated, including those working in 39 HCs (18 rural and 21 urban centers; Table 1).

Data Collection and Instrumentation

Data were obtained from November 2020 to August 2021 through a semi-structured interview. Interview guides were developed considering four core themes and their respective sub-themes. The questions were adjusted according to the activity performed by each type of interviewee. Their activities fell into the following categories: (a) delivery of health services (adaptations in HCs, innovative strategies, referral of cases, attention to priority health programs); (b) human resources (hiring, home shielding, availability, allocation of new health workers); (c) Financing (purchase of equipment and supplies, procurement, management of external support); (d) governance/stewardship (participatory governance, intra/intersectoral coordination, implementation of information systems; Table 1 and code tree in the Supplemental Material).

The interviews were done via video calls due to confinement measures. They were carried out in the interviewee's preferred place (work and home), where they had greater freedom to speak and the best connectivity. The schedule was adjusted to their free time. Only the interviewer-interviewee participated in each interview; on average, they lasted between 30 and 90 minutes. All interviews were audiotaped.

Table 1. Number of Actors Interviewed by Health Management Level and Type of Health Worker and Dimensions of Analysis.

Number of actors interviewed by health management level and type of health worker

States	Responsibles at State health service level	Responsibles at Health Jurisdiction level	Urban health centers	Rural health centers	Sex		Total	Work areas				Total
					Women	Men		Doctors	Health promoters	Nurses	Others (nutritionists, psychologists, chemists, and computer scientists)	
North 1	4	4	10	3	14	7	21	17	3	1	0	21
North 2	1	3	5	13	9	13	22	12	2	7	1	22
South 1	1	3	15	8	15	12	27	13	8	5	1	27
South 2	1	12	7	12	19	12	32	15	9	7	0	31
Southeast	3	4	3	13	9	14	23	12	4	5	2	23
Total	10	26	40	49	66	58	124	69	26	25	4	124

Dimensions of analysis

Dimensions with local focus	Interview guide	Codes	Performed analysis
Health service delivery	1. What reconfigurations had to be done in health facilities to ensure care? 2. How were COVID-19 patients referred and counter-referred? 3. What innovative strategies were implemented?	1. Reconfigurations of medical facilities. 2. Innovative strategies. 3. Reference and counter-reference of COVID-19 patients. 4. Attention to priority health programs.	Each axis of analysis and codes generated homogeneous data based on the conceptual framework of good performance of the functions of health systems, which each entity carried out according to its management capacities, knowledge, and internal organization to face the pandemic.
Health workforce	4. Were there enough health staff and how was it distributed in HCs? 5. What training actions did you identify during the pandemic? 6. What percentage of health staff stayed at home for shielding and how were they replaced?	5. Training. 6. Home shielding. 7. Availability and/or assignment of health staff and new actors.	
Financing	8. Did HCs have equipment and supplies to deal with the pandemic? 9. Were there new health staff hires? 10. What other external support was sought to obtain financial resources?	8. Purchase (equipment and supplies). 9. Recruitment. 10. Management of external support.	
Governance/Stewardship	11. How was community engagement achieved? 12. What coordination actions were carried out within the health sector and with other sectors? 13. What information was collected and was it synthesized, analyzed, and used to make decisions?	11. Participatory governance. 12. Intra- and inter-sectoral coordination. 13. Implementation of information systems. 14. Development of guidelines.	

Source. Prepared by the authors based on the conceptual framework of essential functions of health systems, WHO (2000).

Data Analysis

The *thematic analysis* method was used, according to the proposal of Braun and Clarke (2006). In the Supplemental Material, we detail a thematic outline, and the code tree. In addition, to obtain feedback from the participants before preparing the final report, we presented the results in the participating states through video call meetings.

Ethical Aspects

Permission for the interview was requested directly from the participants, whose data were obtained from contact with the person in charge of each HC. Verbal informed consent was then obtained. Given the sensitive nature of the issue, and considering that they were active staff, participants were ensured that there would be no risks to participate. Any data that could identify them was kept secret to maintain anonymity and confidentiality. The research protocol was approved by the Research and Ethics Committee of Mexico's National Institute of Public Health (Folio CI-1715).

Results

Service Delivery

Reconfigurations in Health care Provision and Health Facilities. The doctors, nurses, and health promoters of the HCs stated that the provision of services occurred in two ways: by providing care in medical units and carrying out community prevention activities. The HCs adapted its infrastructure and reorganized tasks among health staff to treat COVID-19 and non-COVID-19 patients. Urban HCs located in large cities were able to allocate exclusive areas to care for COVID-19 patients. The rural HCs, with only one doctor's office, one doctor, and one nurse, screened people for COVID-19 symptoms at entrances, limited the number of patient companions, and assigned exclusive hours for patients in priority programs and those who manifested respiratory illness. The nursing staff and health promoters were in charge of tracing mobility routes in the HCs, respecting a minimum distance of 1.5 meters between people. Other HCs created waiting rooms outside their facilities. Health promoters and nurses carried out vaccination and health promotion activities. Some of these strategies were modified over the course of the pandemic:

> At the beginning of the pandemic, we were told that patients with COVID would not be treated in HCs, and that all of them would be referred to the hospital. Later, the HCs screened patients and only those with alarm data were referred. (Doctor, rural HC).

Innovative Strategies. State authorities assigned exclusive care units for non-serious COVID-19 patients, aiming to stabilize patients so as not to overwhelm hospitals. Community actions included tracing positive cases and contacts. In rural HCs, this was carried out by teams of health personnel themselves; in urban HCs, the HJ created exclusive health brigades to do that work. In the northern and southern states, health brigades linked up with telephone helplines and information systems. They also provided prevention information in the communities, took samples, and referred patients to hospitals:

> Loudspeakers were used to inform the population about COVID cases; then health brigades went house to house searching for cases for isolation and quarantine of contacts. They gave people information on warning signs, sanitary recommendations, provided telephone follow-up, and if necessary, referral of infected persons to the hospital. (HJ interviewee)

The jurisdictional interviewees of the North 1 state and the two in the south agreed on the need to provide psychological care for the general population and health staff to deal with the sequelae of COVID-19 by helplines and at home (Figure 1).

Case Referral. According to HJ interviewees, the referral of patients from urban and rural HCs to hospitals was accomplished through different mechanisms. Active participation in referrals was supported by hospital ambulances, the Red Cross, or local city councils. Referrals were coordinated by medical staff from telephone centers and digital mobile phone applications.

Priority Health Programs. In addition to caring for COVID-19 patients, the five states prioritized the care of NCD patients, pregnant women, and children under the age of five. In HCs with insufficient medical staff, health brigades, and helplines were set up to follow up on patients with NCDs, who were also provided with medication for up to 3 months. Health promoters and nursing staff used videotaped educational material to encourage physical activity and healthy eating. Flu vaccination was boosted (Figure 1).

Human Resources

Training. A relevant aspect in all the states studied was the ongoing training on COVID-19 care, mainly for medical staff (prevention, diagnosis, and treatment). In some states, HJ staff trained health personnel from the private sector and the education sector using virtual platforms. "Cascade" training was carried out for personnel from different work areas, although it seems to have been insufficient in the case of health promoters and nursing staff who made up the community health brigades.

Home Shielding. In the North 2 and South 1 states, between 40% and 60% of the staff stayed at home, mainly in urban HCs, where personnel with more seniority and chronic illnesses were concentrated. Some rural HC doctors were reassigned to urban HCs to cover absences. A number of HJs

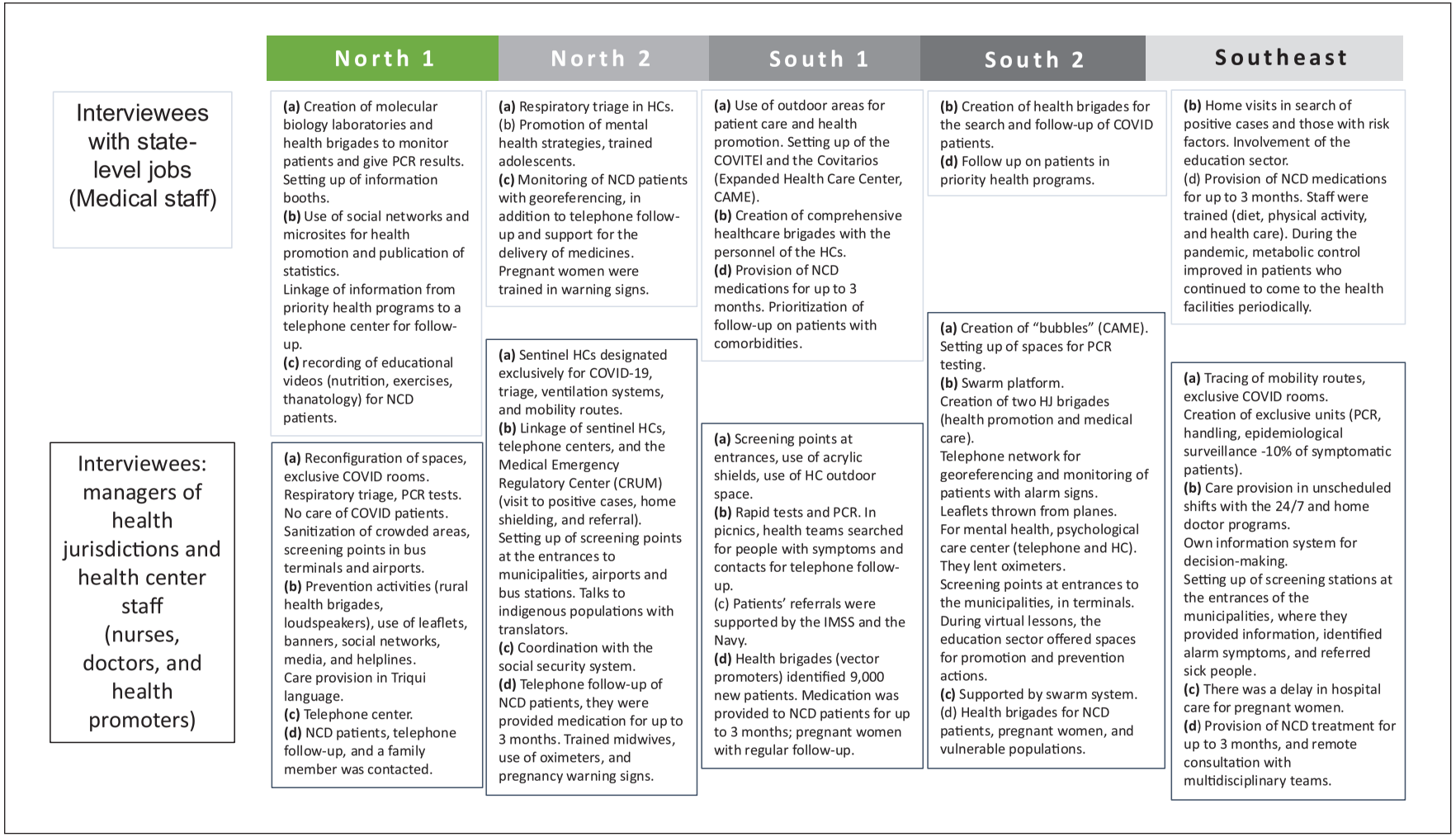

Figure 1. Health Service Delivery: (a) Physical Space and service reconfigurations. (b) Innovative strategies. (c) Patients' referral. (d) Priority Health Programs
Source. Prepared from interviews to key actors.

asked the health staff staying at home to support by telephone follow-up of patients with NCDs or epidemiological surveillance.

Availability and Assignment of New Professionals. In most states, health staff hired (doctors and nurses) during the pandemic performed high-risk activities in exclusive care centers for COVID-19 patients. In the southeastern state, assistance was received from the municipal councils. The staff of the municipal health area helped the HJs by caring for patients at work shifts not covered by public health sector staff.

All the interviewees coincided on the adaptability, good attitude, commitment, and availability of health staff in the face of the emergency, which was also recognized by the community.

> COVID-19 came as a great shock, but it also taught us that we can give a little more. (Doctor, rural HC)

In the southeastern state, in rural HCs with indigenous population, Mayan-speaking health staff collaborated by translating from Spanish and disseminating prevention and health promotion measures (Figure 2).

Financing

Purchase of Equipment and Supplies. The findings on this function were heterogeneous. In the North 1 and South 1 states, the lack of financial resources, supplies, medical equipment, personal protective equipment (PPE), gasoline, and vehicles was evident. In these cases, the doctors and nurses interviewed perceived that the economic resources did not reach the HJs and HCs in a timely manner. For phone follow-up, they used their own mobile phones. In some HJs, the scarcity of resources limited certain prevention and promotion actions. On the other hand, in the South 2 and Southeast states, jurisdictional interviewees reported having received national and state-level support. In these states, the monetary resources translated into the acquiring of supplies, PPE, gasoline, and vehicles for field work.

Hiring. In the southeastern state, the lack of financial resources did not allow for hiring of new personnel. The existing staff were reassigned to urban HCs, leaving rural areas underserved. Four of the five entities received new hires of doctors, nurses, and health promoters, who were assigned to exclusive units for the care of COVID-19 patients or joined health community brigades.

Management of External Support. HC directors and jurisdictional officials sought support from private companies and local mayors and received donations of PPE, supplies for health promotion actions, and lent vehicles for community work. The South 1 state received rapid tests to diagnose COVID from the Pan American Health Organization (PAHO; Figure 3).

Governance/Stewardship

Participatory Governance. Municipal participation consisted mainly of transferring of patients, community prevention activities, dissemination of sanitary measures through loudspeakers, and setting up of screening stations at the entrances of towns and villages. Medical staff and health promoters of urban HJs and HCs encouraged the education sector, universities, religious institutions, radio broadcasters, local telecommunications networks, civil society, and private companies to assist by disseminating sanitary and prevention measures and donating different supplies.

Intra/Intersectoral Coordination. Coordination was achieved at the state and jurisdictional level. Collaboration agreements were reached with social security institutions, high specialty hospitals of the Ministry of Health, and private doctors. These efforts were aimed at better integrating the sector and caring for patients quickly regardless of their health care provider.

Implementation of Information Systems. All the sample states implemented epidemiological information systems, some more complete than others, allowing for local decision-making, both in terms of operational functions and patient referral:

> The platform gives us the total number of active and negative cases, samples taken, deaths, and case fatality rates. Active cases, which are the ones who present symptoms in the last 14 days, generate graphs for any presentation. We know how many contacts we sample for each infected person; how many people is being followed up, how many are linked. . . Patients can also be georeferenced, and their condition can be updated at different levels of care . . . (Jurisdictional epidemiologist)

Development of Guidelines. The North 2 state implemented its own guidelines for the care of patients with NCDs and issued public health and citizen mobility regulations. State officials took advantage of different media and social networks to keep the population informed of the epidemiological situation, communicate, and educate both the general population and health staff (Figure 4).

Discussion

The analysis of the functions of the HS from the perspective of the health professionals who dealt directly with the COVID-19 crisis in Mexico allowed us to take a look at the heterogeneity in the response of local-state health services, which resulted from differences in their organizational capacities, infrastructure, and human resources.

Some relevant findings were the identification of constraints in rural HCs that hampered the referring of patients with warning signs to hospitals as well as the disruption of required outpatient care and routine disease prevention

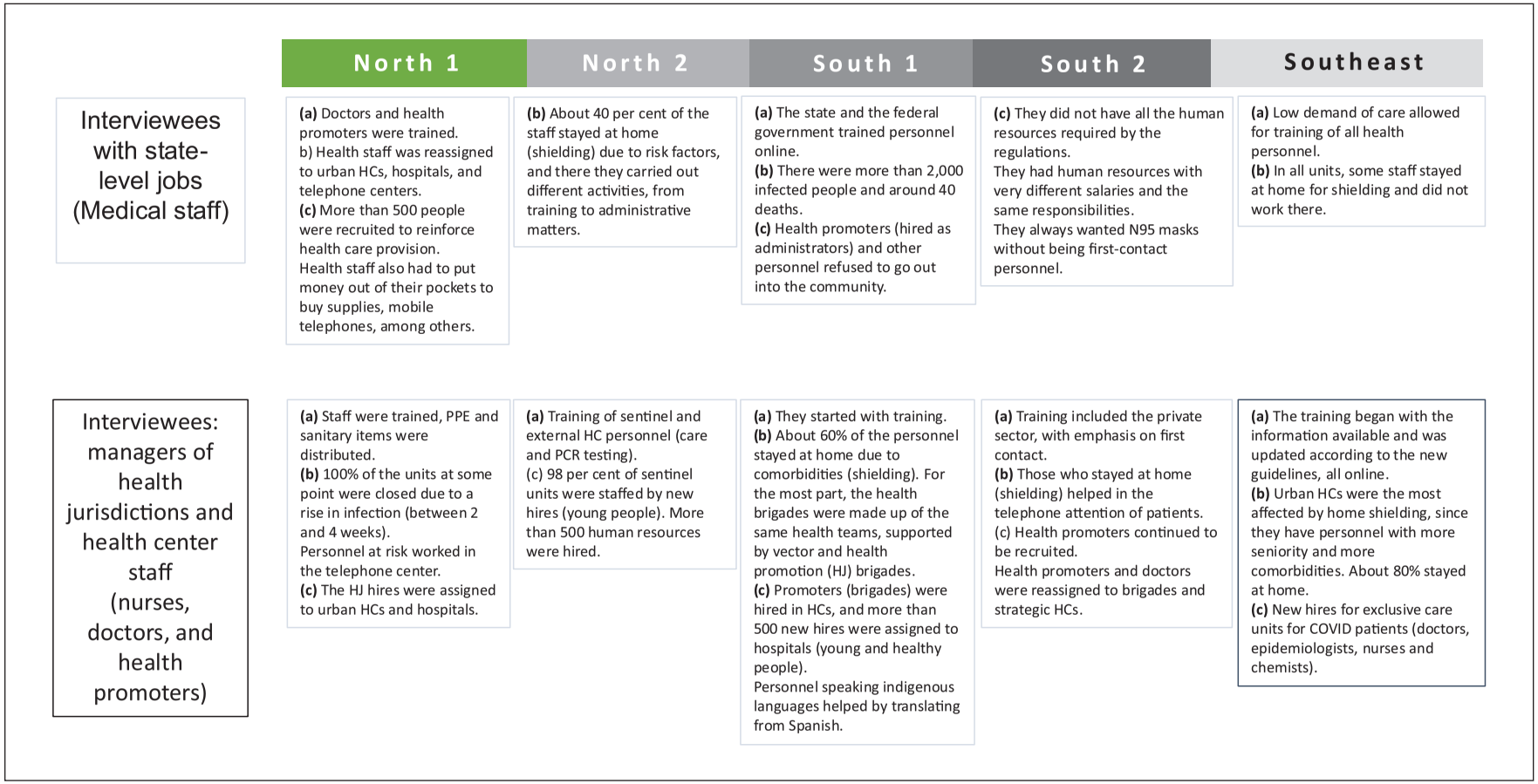

Figure 2. Health Workforce: (a) Training, (b) Home Shielding, (c) Availability, Assignment, and New Actors
Source. Prepared from interviews to key actors.

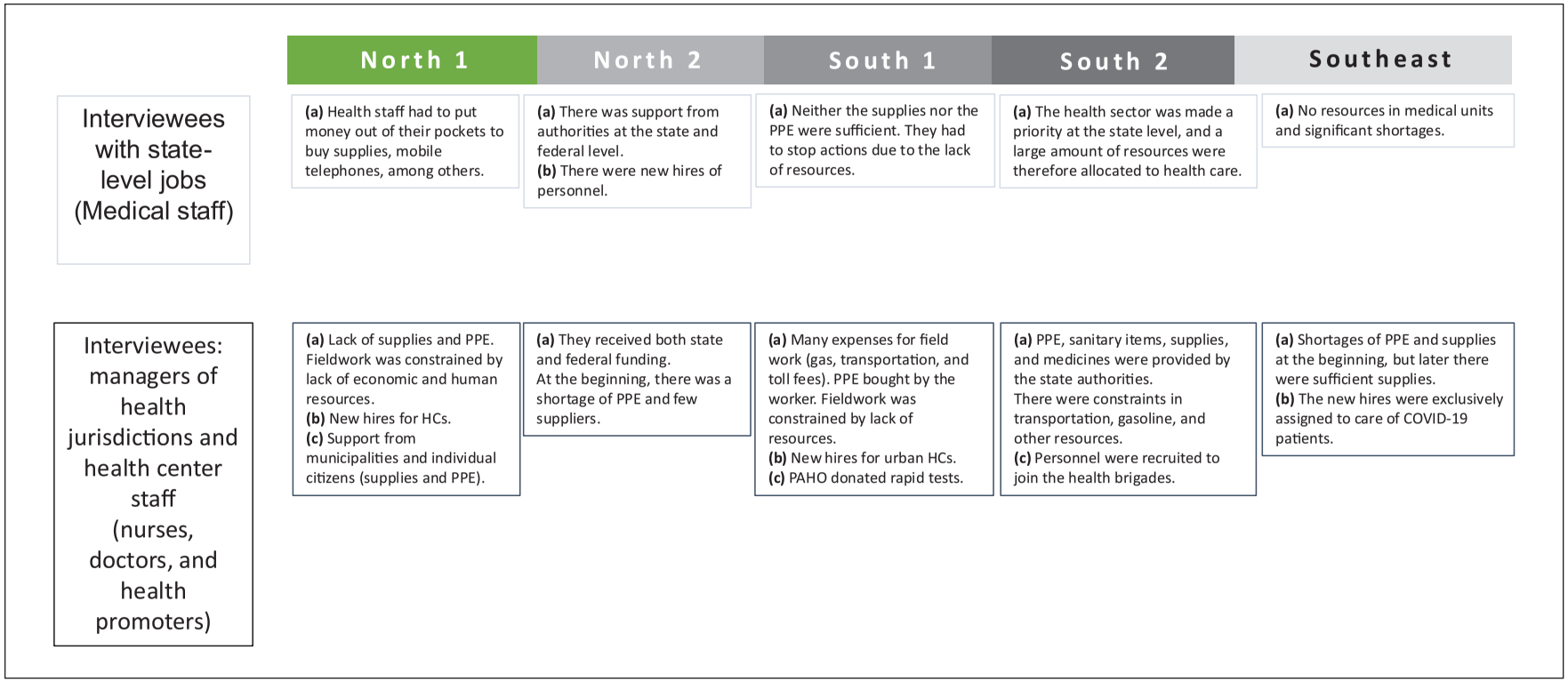

Figure 3. Financing: (a) Purchasing, (b) Procurement, and (c) Management of External Support
Source. Prepared from interviews to key actors.

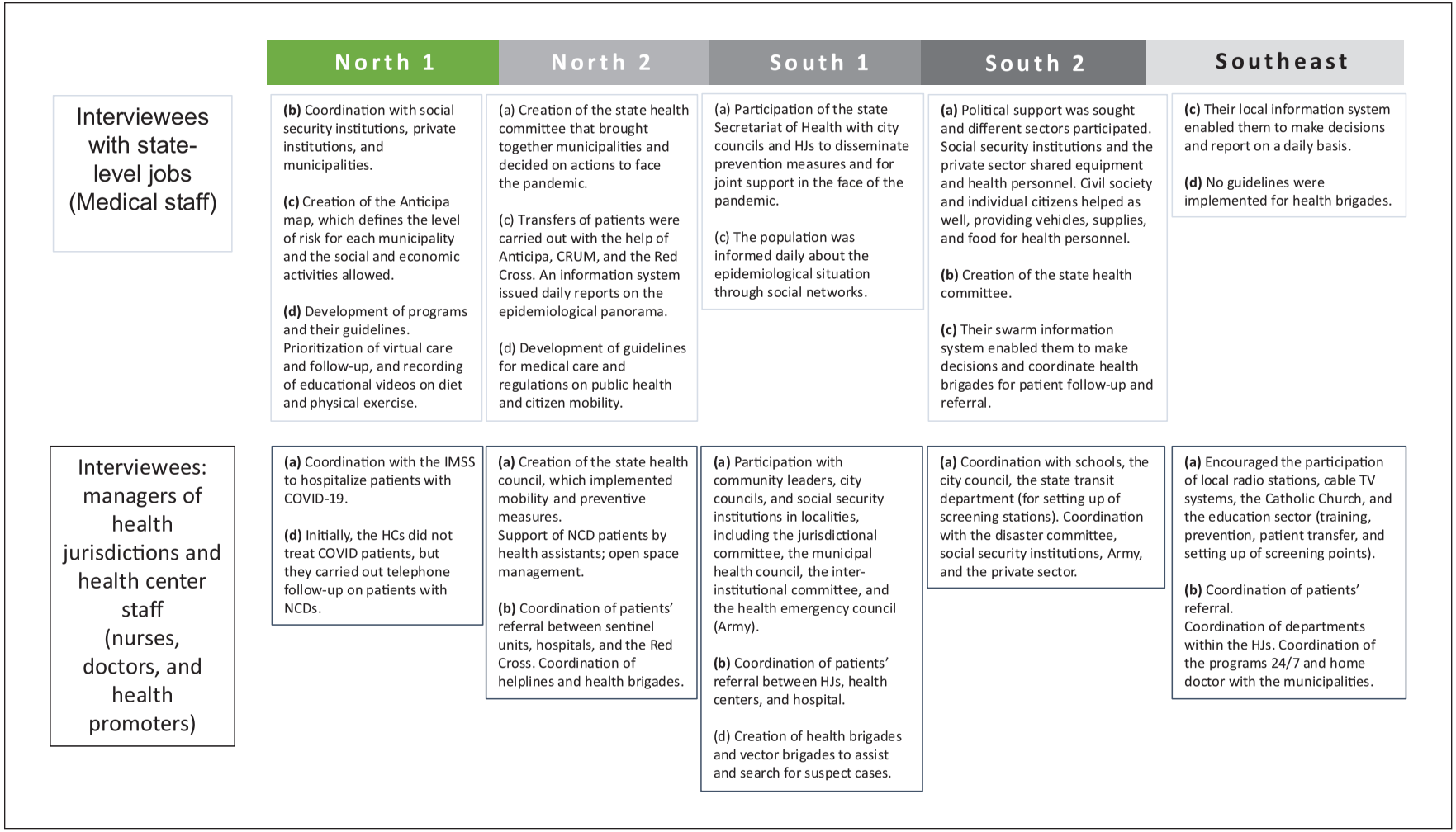

Figure 4. Governance/Stewardship: (a) Participation, (b) Coordination, (c) Information Systems, and (d) Guidelines
Source. Prepared from interviews to key actors.

activities. The existence of distributive inefficiency of staff between rural and urban areas and between levels of care has been reported both in Mexico and in other contexts (Nigenda et al., 2016) and was confirmed in this study. In the states studied, the decrease in health staff in medical facilities due to reassignment to critical areas or home shielding was identified as a critical point that affected daily activities, such as monitoring and control of preventive programs, pregnancy control, and child vaccination.

The financing function is usually the most difficult to analyze from a qualitative approach. In the case of the Mexican HS, where public spending on health has historically been insufficient to cover the health needs of the population (OECD, 2021), the health crisis exacerbated this trend. The testimonies of the interviewees show a disparity in funding for health services in the different sample states, perhaps as a consequence of the lack of coordination between the local or state level and the federal government or as the result of an inadequate and fragmented financing scheme in the states with insufficient funding. In contrast, the states with financial resources to hire health care workers and acquire supplies and medicines could have a greater capacity for resource management by local or state managers, as has been observed in other contexts with better governance (Benjamin et al., 2020; Díaz et al., 2021).

Unlike the weaknesses found in other functions of the HS, the analysis of the governance/stewardship function evidenced the capacity of states for coordination, capacity sharing, and joint participation of health institutions, civil authorities, and the population to deal with the health emergency. The lesson learned is the need to strengthen intersectoral collaboration to face increasingly complex health conditions such as NCDs, as documented by other authors (Schneider et al., 2019).

Based on the experiences of the health professionals responsible for the local response to the pandemic, and in line with the constructivist paradigm (Guba & Lincoln, 1994), we highlight two important aspects in the construction of new knowledge: the nature of knowledge (individual meanings that grow in consensus) and the way in which knowledge is accumulated (vicarious experiences). In the first case, as the pandemic evolved, global consensus was generated regarding the procedures to be followed to address the health emergency. In the second, the health personnel learned by observing and imitating the practices during the training received, since a pandemic of this nature was new for everyone.

The demand for this new knowledge also showed the feasibility of educating health workers through innovative distance training strategies, even in areas far from traditional training centers. Despite the existence of routine training programs, the urgent need to respond to unforeseen health emergencies favored intersectoral organization, representing an opportunity to restructure continuing education programs through the incorporation of an inclusive sectoral model for health personnel with a collaborative approach and taking advantage of virtual tools, as recommended in other studies (Reeves et al., 2017; Sandars et al., 2012). Innovative education strategies using appropriate technologies are key to improve the capacity of human resources through teamwork, coordination, development of professional competencies, and leadership, to move to a patient-centered model based on primary care (Armenta et al., 2022; Frenk et al., 2010; Kumpunen et al., 2022).

The local response to the pandemic demanded a great deal of adaptation on the part of health professionals. It also showed the way to establish appropriate strategies and improve communication with the population. Major modifications to customary organizational processes will need to be analyzed in search of specific opportunities for well-designed programs that help raise the level of resilience of health services and staff, as well as deal with the consequences of unforeseen changes in care outcomes (García et al., 2022; Haldane et al., 2021; Kruk et al., 2015; PAHO, 2020a; PAHO, 2020b). As a result, it can be assumed that the experience of what has been achieved in the local response to state health services, mainly in governance/stewardship, represents a chance to redirect public health policies toward integration of health services, which, like those of Mexico, continue to be segmented, with consequences in terms of disparity in access and lack of universal coverage (Armenta et al., 2022; Eyawo & Viens, 2020; Frenk et al., 2010; González et al., 2020; Kumpunen et al., 2022; Schneider et al., 2019).

Finally, there are limitations to this work. Its interpretation is applicable only to the health services studied, which prevents its generalization to other regions and institutions in Mexico or in other contexts. In addition, the qualitative approach makes it impossible to specify the magnitude of the phenomena identified. Further research will be needed to demonstrate the relationship between the performance of core functions of HSs and its impact on indicators of priority programs, such as NCDs, maternal health, morbidity, and mortality from COVID-19 (Colchero et al., 2021).

In conclusion, this work identified relevant aspects of the capacity of local health care services, some common but others specific to the context, which, from the perspective of the actors responsible for these services, were key to organize their own response to the COVID-19 health emergency. Additional studies are essential to propose new strategies aimed at achieving the resilience of the HS through the strengthening of its functions.

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Supplemental Material

Supplemental material for this article is available online.

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