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Preparing for Future Emergencies: Insights from Costa Rica and the Dominican Republic in Maintaining Essential Health Services During COVID-19

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Abstract

What is the message? When public health emergencies occur, health systems must not only manage the outbreak, they must also maintain their essential health services. The authors provide recommendations on how to better prepare for future pandemics: 1. coordinating actions and distributing resources across levels of care and geographic regions, including access to real-time resource data, and 2. developing crisis management plans that define administrative procedures, health services priorities and delivery, and financing.

What is the evidence? A series of recommendations for health systems' preparedness based on on the analysis of efforts by Costa Rica and the Dominican Republic to maintain EHS during COVID-19, The two countries were selected among six countries worldwide for their exemplary handling of the pandemic, compared to similar nations, based on certain quantitative outcomes.

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Introduction

COVID-19 represented a significant challenge for health systems worldwide, both in the approach health institutions took to the new disease and in maintaining active essential health services (EHS) for the general population. Data from the WHO pulse surveys reveal that 90% of countries reporteddisruptions to EHS during the COVID-19 pandemic (1). In the face of the unprecedented challenges brought about by the pandemic, the importance of crisis management and preparedness in the health sector became exceptionally crucial (2,3). This phenomenon renewed the interest of consulting companies and scholars in managing crises (4–7). Overall, the cumulative experiences derived from crisis-driven reorganization and expert leadership underscore the importance of preparedness in navigating the inherent complexities of crises.

In this paper, we provide insights for future pandemic preparedness based on the responses of two healthcare systems in Latin America that undertook measures to maintain their EHS during the COVID-19 pandemic. Costa Rica's and the Dominican Republic's healthcare systems have significantly different organizational structures for providing mandatory healthcare insurance. Healthcare provision in Costa Rica—at all levels of care—is under the responsibility of a single public provider. In the Dominican Republic, multiple healthcare providers—public and private—coexist at various levels of care. As in previous literature, we refer to the former as an "integrated" healthcare system and to the latter as "fragmented" (8).

Both these countries have a universal health insurance mandate, but they differ in terms of healthcare providers, how funding is distributed among them, and who collects the insurance contributions. Funding mechanisms for both systems include 1) a contributory regime financed

by payroll taxes that covers formalized workers and 2) a subsidized regime financed by general taxes that covers low-income and unemployed people.

In Costa Rica, the Costa Rican Social Security Fund (CCSS) is the single institution responsible for providing the healthcare services of the mandatory health insurance known as Sick and Maternity Insurance (SEM). SEM provides access to the same health package of services to all users. The CCSS provides healthcare through a network of 626 primary-level clinics, 20 regional hospitals, 17 second-level clinics, three third-level national hospitals, six specialized hospitals, and six specialized centers that cover over 97% of the population (9,10).

Healthcare provision in the Dominican Republic is offered by public and private providers, organized under regulated competition in a compulsory health insurance system (11,12). In 2001, the Dominican Republic created a universal health insurance scheme called Family Health Insurance (SFS) that provides all users the same basic package of services. in the contributory regime is provided by multiple insurers (i.e., public and private, for-profit and not-for-profit), known as *Administradoras de Riesgos de Salud* (ARS). These ARS receive the same per-capita payment from the Social Security Treasury each month to provide a single package of services that the National Council of Social Security defines. They contract services with a network of public or private providers organized by levels of care, known as *Prestadoras de Servicios de Salud* (PSS). The most important ARS in terms of insured population is public, the Seguro Nacional de Salud (SeNaSa), which is the only one authorized to affiliate the population in the subsidized regime. Although it originally contracted mainly public providers at the Servicio Nacional de Salud (the general provider's network), if it cannot find quality services within the network, it can pay private providers for these instead. By 2019, 78% of the population had mandatory health insurance. In 2020, due to the pandemic, the government increased the insurance coverage to 95%.

Costa Rica and the Dominican Republic differ in who collects the money and how it is distributed between healthcare providers. In Costa Rica, the CCSS is responsible for collecting SEM contributions. The money goes to a shared pool managed by the CCSS, which distributes it on a capitation basis and according to historical transfers of the different clinics and hospitals. In the Dominican Republic, SFS contributions also go to a shared pool managed by the Social Security Treasury, which distributes it among insurance agencies on a capitation basis, and insurance agencies pay healthcare providers through a service fee.

Table 1 compares selected indicators measuring Costa Rica's and the Dominican Republic's health system performance in 2019.

Table 1: Selected indicators measuring Costa Rica and Dominican Republic health system's performance in 2019 (or the latest year available)

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Indicator	Costa Rica	Dominican Republic
HEALTH OUTCOMES		
Population (in million)	5.1	10.8
Life expectancy at birth (in years)	80.1	73.2
Median age (in years)	33.4	28.0
Universal Health Care effective coverage index (0-100)	79.0	52.0
DTP3 coverage in children (%)	97%	75%
Age-standardized smoking prevalence (%)	Women: 7.2% Men: 15.3%	Women: 9.3% Men: 13.7%
Average body mass index	27.5	27.5
All-age diabetes prevalence (%)	8.1%	4.1%
All-age cardiovascular diabetes prevalence (%)	5.8%	5.8%
All-age cancer prevalence (%)	6.5%	4.8%
Mean PM2.5 air pollution	15.4	13.3
RESOURCES		
Physicians (per 1,000 people)	2.89	1.45
Nurses and midwives (per 1,000 people)	3.41	1.46
Hospital beds (per 1,000 people)	1.10	1.56*
HEALTH EXPENDITURE AND FINANCING		
GDP per capita (current international $ PPP)	$22,608	$18,942
Current health expenditure (per capita)	$1,623	$803
Current health expenditure (% GDP)	7.22%	4.24%
Out-of-pocket health expenditure (per capita)	$201	$180
Out-of-pocket health expenditure (% of total health expenditure)	18.1%	36.8%

Notes: (*) refers to data from 2017. Sources: own elaboration based on analysis from (14–16).

Methods

We based this paper on a multi-country effort led by the Exemplars in Global Health (EGH) initiative from the Gates Ventures Foundation to understand the COVID-19 response from six countries and how it affected or contributed to maintaining Essential Health Services (EHS). The individual country results are available on the EGH website (14). The six countries were chosen for their exemplary handling of the pandemic compared to similar nations, based on key COVID-19 metrics (like age-adjusted death rates, per capita case numbers, and test positivity rates) and EHS metrics, such as the impact on vital immunizations. The selection process for the EGH report also included a review of relevant literature and policies, interviews with regional experts, and the potential applicability of their strategies.

Local research teams in each of the six countries then conducted comprehensive research, using mixed methods to uncover effective strategies for managing COVID-19 and sustaining EHS from April 2021 to September 2022. This included extensive desk research, interviews with key stakeholders, and quantitative and qualitative data analyses. The teams produced final reports summarizing national efforts to preserve EHS amid the pandemic and highlighting effective policies and practices for handling COVID-19. In this paper, we examined the country case reports for Costa Rica and the Dominican Republic in the EGH website and compared the findings from the two countries to uncover actionable lessons and insights to enhance other health systems' resilience and improve preparedness for future pandemic responses.

Recommendations for strengthening preparedness for future pandemics

Based on Costa Rica's and the Dominican Republic's responses to maintaining EHS during COVID-19 (for more detail on these countries' responses and outcomes, see (14,17,18)), we provide the following recommendations. First, governments must aim to coordinate the response throughout the health system. Second, health systems must define *ex-ante* a crisis management plan. While these recommendations were undoubtedly useful for Costa Rica and the Dominican Republic, they can be considered by other countries when preparing for emergencies.

Recommendation 1: Coordinate the response throughout the healthcare system.

Health systems are organized to provide multiple levels of care, with hospitals and clinics distributed in various geographic regions throughout the country. The provision of health services to the population are often shared by public and private institutions, whose prominence will depend on how the country's mandatory health insurance operates. During an outbreak, physical and human resources, as well as medical equipment, become insufficient. Thus, managing limited resources and avoiding saturation of facilities is essential to maintaining EHS. Coordination among facilities and levels of attention within a single institution like in the CCSS or among public and private health providers like in the Dominican Republic contributes towards this goal. Such coordination efforts are enhanced if there is access to data that allows decisionmakers to allocate resources efficiently. To illustrate how health systems could implement this coordination, we describe what these two countries did in terms of the transfer of patients and access to data for decision-making.

a. Transfer patients throughout the health system. CCSS's vertically and horizontally integrated system allowed for the implementation of new strategies for transferring COVID-19 and non-COVID-19 patients among hospitals in the network and among various levels of care. The CCSS noticed that the pandemic affected regions differently, so COVID-19 patients were distributed across different areas of the country. Aiming to make efficient use of the available resources, the institution also created a communication infrastructure specialized in emergency transfers of COVID-19 patients. The communication infrastructure included a team of healthcare workers (known as PRIME, an acronym in Spanish for First Specialized Medical Intervention) and a communications center (the COV-19 team) that centrally coordinated transfers based on real-time data about network availability and patients' health records.

PRIME transferred patients located throughout hospitals to the CEACO, Costa Rica's COVID-19 specialized center, and vice versa. This transfer of patients was important given that some clinics and hospitals in rural areas were not equipped to handle large numbers of seriously ill COVID-19 patients. The COV-19 team focused on finding available beds in the system for COVID-19 patients, hence contributing to maintaining EHS by allowing the system to avoid hospital overcrowding and the collapse of hospital care.

In the case of the Dominican Republic, the coordination efforts and transfer of patients were not within a single institution but instead among public and private health providers in the system. Strong leadership at the highest level of the Health Cabinet—above the Ministry of Health—was

crucial to achieving a public-private partnership that allowed for the transfer of patients among providers. The Health Cabinet provided a coordinated response through multisectoral and public-private partnerships and effective coordination between the government and the private sector. The Health Cabinet coordinated this partnership, which helped ensure big hospitals did not reach maximum capacity and that ambulances were available in selected hospitals to help transfer patients among facilities.

Organizing a coordinated response within a single institution, such as the CCSS, is likely to need fewer stakeholders sitting in the same room than in a health system with multiple public and private providers. The former involves reaching agreements and redistributing resources (e.g., financial or personnel) internally; regarding the latter, the different logic and incentives of public and private providers are likely to increase the complexity of the coordination efforts. Thus, strong leadership is even more essential when communicating among stakeholders from different organizations. Finally, one challenge to providing a coordinated response has to do with budgets. Transferring patients and healthcare workers between and within health facilities challenges the directors of hospitals and clinics that run these facilities under tight budgets.

b. Share real-time data for decision-making. Health facilities throughout the system should establish a mechanism to share data in real time during an outbreak. Information on the availability and location of health resources (e.g., beds, ICUs, surgery rooms, ambulances, doctors) is essential to support the coordination efforts in the system, both for coping with the pandemic and for maintaining EHS. This data can help decisionmakers allocate patients (from the pandemic and EHS) across the system and effectively deploy the beds, intensive care units (ICUs), laboratories, and healthcare workers. Ideally, this information would be made available in a centralized information system.

In Costa Rica, the existence of a single digital medical health record that is accessible from the "cloud" helped the CCSS maintain EHS. The Single Digital Health Record (EDUS for its acronym in Spanish) works as a unified and integrated technological tool for individual patient health records. Healthcare workers can access EDUS at the point of care and can record notes about patients, which are accessible by colleagues. EDUS also records information on the provision side, including, for example, production indicators from the healthcare workers and bed occupancy rates. This digital record helps to monitor the system's production indicators through reports and real-time dashboards. EDUS allowed for real-time data access on the number of

available beds throughout the system and for sharing patients' medical health records among doctors in different health facilities. In addition, this technology was deployed by a decision-making top-management team that analyzed the information generated by this platform and used it to reassign COVID-19 and non-COVID-19 patients and resources throughout the network.

In the Dominican Republic, in view of the need for a centralized information system, the Ministry of Defense developed a digital platform that centralized data from public and private hospitals, clinics, laboratories, pharmacies, and insurance agencies. The Command, Control, Communications, Computers Cybersecurity and Intelligence Center (C5i) of the Armed Forces and the Ministry of Health (MOH) coordinated this platform that provided real-time data on the number of beds available and in use in a hospital, ICUs, ventilators, and ambulances. Private sector providers volunteered their data to feed the system, strengthening the public-private partnership mentioned above and facilitating the transfer of patients among networks. The platform was most useful in ensuring that large hospitals did not reach maximum capacity. With the hospital occupancy data, the SNS transferred patients who were not in need of exclusive treatment in specific hospitals to less-occupied health centers, depending on the complexity and severity of their cases.

In addition to these platforms that allowed the sharing of resources' inventory data, and in the case of Costa Rica, also patients' medical records, both countries had special committees or artificial intelligence systems tracking the evolution of the pandemic and making projections to predict the behavior of the virus and act accordingly.

Previous research on crisis management has highlighted the vital role of systematically gathering and using precise information, emphasizing its direct impact on possible outcomes (19,20). Studies in this field outline key elements like timely information distribution, optimal data for decision-making, and smooth information flow as essential to effectively manage crises (19). In addition, they assert the need for leaders to embrace innovative methods (e.g., big data analytics) to optimize crisis response strategies (20).

Recommendation 2: Define ex-ante crisis management structures for decision-making.

A crisis management plan needs to begin with early identification and intervention to mitigate

potential issues (21). This procedure involves anticipating problems, allocating resources, establishing information systems, and formulating action plans. Afterward, it is cruical that the organizations implement a prevention plan that include continual monitoring, audits, a crisis scenario assessment, and comprehensive planning to be ready for a potential crisis.

Decision-making, data sharing, and coordination efforts during an emergency are likely to require additional structure, like special committees and cross-disciplinary and inter- or intra-institutional teams. Our second recommendation advises decisionmakers to develop an ex-ante crisis management plan that establishes a basic governance structure and procedures to support EHS during a pandemic so that it becomes the first “go-to” structure that helps sustain EHS services and addresses the emergency. Of course, such a governance structure does not have to operate all the time, but health systems should establish a fundamental “go-to” operation mode that activates as soon as authorities declare a public health crisis.

The crisis management plan should include at least four elements:

a. Determine exemption rules.

Once a pandemic or public health emergency starts, it is difficult to process permissions to change managerial procedures or make exemptions. Market conditions might require expedited procurement practices, which need to be authorized by other institutions. Given the high levels of urgency during crises, these exemptions should be authorized in “normal” times before the next crisis. The exemptions can also include flexible job descriptions for HCWs once an emergency is declared along with task shifts, i.e., a rational redistribution of tasks among health workforce teams to help address shortages of HCWs (22). The objective is to activate a set of exceptions under certain conditions, decreasing improvisation or negotiating permissions under pressure.

Local legislation in Costa Rica foresees some procurement and managerial exceptions, and other countries can review their legislation to confirm the existence of similar opportunities in the public sector. More flexible bureaucratic procedures during an emergency are fundamental to facing a pandemic, as it is likely that there would be scarcity, price speculation, and competition for health supplies and equipment in international markets. In the Dominican Republic, once an emergency is declared, public sector entities can make more flexible internal and external

procurement decisions. Their experience using this administrative mechanism builds on previous public health emergencies (e.g., Zika) and natural disasters (e.g., hurricanes). However, even with irregular fast-track procurement, it is important to keep minimum quality controls active, even during emergencies. While eased purchasing procedures in Costa Rica were undoubtedly important during the pandemic, they have also been accompanied by criticisms from the local press and institutional audits related to questionable procurement processes.[1]

b. Establish a list of Essential Health Services

Authorities must establish a list of which are to be considered EHS in case of an outbreak. The services listed must continue to be provided while the health systems battle the pandemic. During an emergency, the authorities can revise the list of EHS and prioritize according to the pandemic's context. Neither the CCSS in Costa Rica nor the Dominican Republic had such a list. However, in the case of Costa Rica, a mandate by CCSS headquarters early in the pandemic to reduce in-person medical visits indirectly prioritized some specialties. Similarly, the Dominican Republic implicitly defined what was essential, given the allocation of resources among non-COVID-19 patients. Nevertheless, establishing ex-ante what the EHS are, would include the country's epidemiological profile, priorities, and costs of interrupting services for specific patients.

c. Define which services should be delivered in person or through alternative modalities.

The experience with alternative modalities of care during COVID-19 can inform decision-making, not only in terms of the choice of the services to deliver virtually, but also which technology or platforms appropriate are most appropriate. For online services, authorities should consider how to provide auxiliary services (e.g., x-rays, lab tests, medications) for healthcare workers to deliver effective services to patients, having the appropriate inputs and data for recommendations, diagnoses, or prescriptions.

In Costa Rica, the pandemic increased the use of alternative modalities of care that were already being adopted on a small scale; these modalities included remote patient monitoring, call centers for COVID-19 patients, and partnerships to expand service delivery. Supporting alternative modalities of care allowed the CCSS to maintain outpatient visits, to follow up

remotely on non-COVID-19 patients, and to protect healthcare workers and patients from infection. Remote patient monitoring (RPM) enabled healthcare workers to conduct remote consultations via telephone or video calls. RPM proved valuable for certain specialties that did not require physical examinations. Additionally, RPM facilitated post-diagnostic follow-up once lab results were ready in the electronic medical record, EDUS, further reducing non-urgent in-person visits.

In the Dominican Republic, the Critical Care Telemedicine Project aimed to connect healthcare workers of provincial hospitals with high-complexity base centers specializing in critical care. The project improved the referral system and flow of coronavirus patients to higher-level care centers, improved the efficiency and quality of health services in critical care, and promoted collaborative work between local teams of healthcare workers. Additionally, some private ARS, such as ARS Humano, introduced telemedicine services with the company TELEMED, providing audio or videoconference services with a network of doctors who offer information and guidance, interpretation of test results and diagnosis, and electronic prescriptions. Another one of the largest private ARS, called Mapfre, offered advice and medical support via telephone and the Internet through its Audio Doctor platform. ARS Universal has its Universal En-Línea app, in which it offers guidance on coverage for the Covid-19 test, laboratories, and other services with its affiliates.

The pandemic provided an opportunity for health systems to scale up what, at the time, were pilot telemedicine projects and to learn about the challenges these modalities pose in terms of equity and quality of healthcare. While useful, RPM also raised concerns among key stakeholders around the quality of care and equitable access to these alternative modalities of care. Challenges included healthcare providers' limited experience with these tools, insufficient quality control, and barriers to technology access for low-income patients. Patient associations noted feelings of neglect in the absence of in-person doctor visits despite the benefits of telemedicine. Key stakeholders also reported during the interviews that patients with a scheduled appointment did not answer the phone or did not have a data plan to access the video call; other patients required help, given technological gaps in the use of smartphones and video call applications. RPM highlighted challenges related to healthcare equity and quality, particularly for services that necessitated in-person attention, such as surgeries.

d. Define how to finance the response through contingency funds.

Public health emergencies are likely to demand that the health system acquire additional medical equipment and supplies, human resources (new hires or extra hours), technologies, and medications. Thus, it is essential to have a contingency fund when an emergency is declared. In Costa Rica, the existence of sufficient financial resources was one of the main reasons CCSS was able to maintain EHS during the pandemic. The CCSS used its contingency fund to build infrastructure, purchase equipment, and hire additional HCWs. Created in 2016, the fund provides monetary resources to the CCSS in case of disasters such as earthquakes, floods, or fires affecting the CCSS health services. During the pandemic, the fund received additional investments from the Costa Rican government and loans from international finance institutions. This fund financed most of the $101 million adaptations the CCSS underwent through the pandemic (23). In addition, the CCSS was able to tap $40 million from different MoH programs (like AIDS and Vector-borne diseases budgets) and a $52 million Emergency Fund from the National Emergency Commission.

In the Dominican Republic, the government assigned financial resources from an international loan that was previously approved for a specific project. Despite having a contingency fund, authorities were not able to draw resources from it, as it had no available funds available, and for years the responsible organizations did not allocate the corresponding resources.

Conclusion

Neither Costa Rica nor the Dominican Republic are wealthy countries. Yet, they have achieved better health outcomes than many high-income countries, while spending significantly less on health (15). In the case of Costa Rica, sustained investments in the welfare state have enabled a functioning healthcare system that works even in the event of unexpected public health emergencies. In 1995, the CCSS adopted a primary healthcare reform recognized as a role model worldwide (24). With its tradition of innovation, by 2018, the CCSS had implemented a unique digital medical record throughout its integrated network of health facilities, allowing the institution to have real-time data for decision-making. This timely innovation enhanced CCSS's response to the COVID-19 pandemic, while also enabling Costa Rica to maintain EHS.

In contrast to Costa Rice, both public and private insurers are providers of mandatory health insurance in the Dominican Republic. Nevertheless, through strong leadership at the highest level (e.g., Health Cabinet) and relying on previous crisis management experience, the country

managed the pandemic effectively.

Insights from these two health systems suggest that it is extremely helpful for a country to be able both to: 1) pool scarce healthcare resources to maximize their effectiveness; 2) have a centralized system of data collection that is available to all key healthcare decision-makers; and 3) have an institutional flexibility to change procedures, and quickly, when necessary.

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