

Maintaining essential health services during a pandemic: lessons from Costa Rica's COVID-19 response

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ABSTRACT

Studies on COVID-19 usually focus on health system responses to decrease the rate of COVID-19 infection and death, but patients with other diseases also require access to health services during the pandemic. This paper describes the structures and processes by which the Costa Rican Social Security Fund (CCSS) changed in response to the COVID-19 pandemic, which helped to sustain essential health services (EHSs). We conducted a desk review of the local literature and semistructured qualitative interviews with key informants from the CCSS. We found that the CCSS implemented changes in structure, such as creating a specialised COVID-19 centre and hiring additional interim health workers. The CCSS also implemented changes in processes, including leveraging its integrated network to optimise its resources and support alternative care modalities. These changes generated changes in outputs and outcomes that helped sustain EHSs for non-COVID-19 patients. These interventions were possible primarily due to Costa Rica's underlying health system, particularly its integrated nature with a single institution in charge of healthcare provision financed through mandatory health insurance, a unique digital medical record system and a contingency fund.

INTRODUCTION

COVID-19 posed a significant challenge to health systems worldwide, impacting their response to the new disease and their ability to maintain essential health services (EHSs) for the general population. The WHO pulse surveys reveal that 90% of countries reported disruptions to EHSs during the COVID-19 pandemic.¹ While the predominant research focus has been on studying COVID-19 responses and preparedness, limited attention has been given to sustaining EHSs during a crisis.^{2–8}

During the peak of the pandemic, Costa Rica balanced the response to COVID-19 with the maintenance of certain EHSs compared with other Western Hemisphere countries. Online supplemental figure A1 shows that, during 2020, Costa Rica maintained its high DTP3 immunisation rate during the pandemic (the

SUMMARY BOX

- ⇒ Worldwide, countries during the COVID-19 pandemic struggled to provide adequate healthcare services due to the high demand for care and shortages of resources and personnel. Lockdowns, fear, and misinformation further complicated matters.
- ⇒ This study analyses the effects of the pandemic on essential health services (EHSs) rather than on COVID-19 patients.
- ⇒ This study identifies changes in the structure and processes that contributed to sustaining EHSs, as well as the health system's enablers.

fourth highest in the Western Hemisphere in 2019; the rate even increased slightly) while maintaining a rate of COVID-19 deaths per million that was similar to that of Canada throughout 2020.^{9 10}

This paper analyses how the Costa Rican Social Security Fund (CCSS), the country's leading healthcare provider, sustained EHSs during the COVID-19 pandemic. It aims to (1) describe the pandemic's impact on routine health services, (2) document strategies for maintaining EHSs, and (3) identify enablers for sustaining EHSs during the crisis.

STUDY DESIGN: BACKGROUND INFORMATION

Background information

We performed this study in Costa Rica, a middle-income country in Central America. In 2019, it had a population of five million people and the third-highest life expectancy in the Western Hemisphere, despite not spending as much on health and having a smaller GDP per capita than other countries in the region.¹¹ Costa Rica's health system is mostly funded by compulsory health insurance schemes (70% by 2019) and household out-of-pocket payments (22%), with government schemes and voluntary healthcare payment schemes representing only 4% each.¹²



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The Ministry of Health is responsible for public health regulations, epidemiological surveillance, and research and development in health; it does not provide health-care services. The most important healthcare provider in the country is the CCSS, an autonomous public institution funded by mandatory contributions from all formal workers, employers, and the state; the latter also covers vulnerable populations. By 2019, the CCSS's health insurance covered 85% of the population, and its revenues represented approximately 70% of all health expenditures in Costa Rica.^{12 13} The CCSS provides preventive, curative, and rehabilitative healthcare services through a network of public hospitals and primary care clinics that cover more than 97% of the population.¹⁴ The network is present across three different levels of care. The first level is the system's gatekeeper and provides basic health-care services through 1 057 community healthcare teams (known as EBAS) managed by 105 primary-level clinics (known as health areas). The second level supports the first level by providing healthcare services with varying degrees of complexity and specialty. It includes a network of 20 regional hospitals and 17 clinics. Finally, the third level provides healthcare with the highest level of specialisation and complexity. It includes a network of three national hospitals, six specialised hospitals and six specialised centres.^{15 16}

To provide healthcare, the CCSS leverages a unified digital health record known as the Unique Digital Health Record (its acronym in Spanish is EDUS). The EDUS is a unified cloud-based medical record system, an ambitious warehouse of personal health data that records hospital emergency attendances, admissions and discharges, and surgical operations digitally. It also integrates personal health records (including diagnoses and treatments) with the national appointment system for planned elective care. The EDUS is accessed from the cloud by health workers and patients have access to their own clinical history. The CCSS rolled out the EDUS from May 2015 to December 2018. Since then, the EDUS has become a control tower that has made it possible to concentrate information, monitor the occupancy rate of beds by a health facility and manage transfers. By the time the pandemic began, the EDUS was widely used across all levels of attention and by CCSS health workers to record patient visits, making Costa Rica one of the first countries in the world to have a single, national electronic health record that is unified across all levels of care.¹⁷⁻¹⁹

Study design

In a pandemic context, essential services are those health interventions that should be unconditionally protected and delivered, even if substantial resources need to be diverted to respond to the outbreak. For this paper, we reviewed a list of 120 EHSs proposed for low-income and middle-income countries to prioritise during an outbreak based on the probable magnitude of the harm that would occur from interruptions or disinvestment in these services.²⁰ As each country will need to

define what is essential for them, according to its health system capacity, available resources, and epidemiological profiles, for Costa Rica, we focused on three categories from this list: maternal and newborn health, cancer, and cardiovascular and related disorders.

To understand how the CCSS sought to maintain EHSs during COVID-19, we followed an explanatory sequential design in which qualitative and quantitative data were collected and analysed to generate our findings.²¹ In the first phase, we collected and analysed qualitative data through a desk review and interviews with key informants (KIs). We used the data from the desk review to inform the design of the semistructured interviews. In the second phase, we validated our insights from the first phase with quantitative data from EHS performance.

We started by reviewing research papers (both peer-reviewed or unpublished), books, policy documents, and newspaper articles looking for practices for EHS maintenance adopted by the CCSS for COVID-19 in 2020 or 2021. For documents other than newspaper articles, we searched Google Scholar, PubMed, BINASSS (the local library on health and social security), and organisation websites, including the WHO and the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), for scientific publications, reports, and policies from September 2021 to July 2022. The inclusion criteria comprised institutional practices, actions or programmes implemented by the CCSS at any of its different managerial levels in response to the COVID-19 pandemic in 2020 or 2021 and that affected EHS maintenance. We excluded reports that described actions to control COVID-19 implemented by local public institutions or ministries other than the CCSS. We excluded reports documenting the country's economic and financial response to COVID-19, as well as reports documenting the country's public health and healthcare responses, if they did not influence EHS maintenance. For news articles, we used Google News to find printed and online newspapers, magazines, and blogs published by local and international private and public organisations and institutions between January 2020 and December 2021, focused on those related to EHS maintenance and the CCSS. We gathered 13 newspaper articles, 13 journal articles, one book, 12 white papers or official institutional reports and six websites. We extracted data into a Microsoft Excel template to summarise the responses, their enabling factors, how they helped sustain EHSs and how they induced changes in the structure of the CCSS (such as changes in staffing mix or profile) and in the processes (such as how patient consultations are organised or the modalities for dispensing medications).²²

Qualitative data were gathered through semistructured interviews with KIs from the health sector in Costa Rica. Interviewee selection was intentional, aiming for a representative sample of various actors. We included representatives from different levels of care (such as first-level care, clinics and specialised hospitals), sectors (including public, private, and civil society or patient groups) and

work roles in the response (such as strategic, operational, and tactical roles, eg, directors of health areas, clinics, and hospitals, doctors, and coordinators). The research team contacted KIs via email and social media (eg, WhatsApp) to schedule interviews, including a statement about the research goals in the initial communication. At the start of each interview, the interviewer explained the project's objectives, research background, and confidentiality terms, and asked for the interviewee's verbal consent to participate in the research. Using an interview guide (online data supplement), we explored themes and practices related to COVID-19 response and maintaining EHSs through open-ended questions. Interviewers also welcomed emerging themes highlighted by interviewees as significant to the Costa Rican response. After each interview, we asked participants to suggest other key actors who could contribute valuable insights, facilitating a snowball effect in our recruitment process.

Between October 2021 and February 2022, we conducted 21 interviews of an average length of one hour, with 26 KIs using Google Meet due to COVID-19 restrictions. Online supplemental table A1 shows the profile of the interviewees. The interviews were carried out in Spanish by two experienced members of our research team, AAP (internationalist, male) and AMP (economist, female), skilled in qualitative research methods from various projects. The interviews were audiorecorded and transcribed. AAP also took field notes during the interviews and reviewed the transcripts to ensure alignment with the audio recordings. After completing the data collection, we analysed the data through content analysis by identifying and coding themes drawn from the interview transcripts.²³ AAP used qualitative analysis software (Atlas.ti) to code and analyse the transcripts and audio, focusing on healthcare providers' strategies to maintain services during the COVID-19 pandemic. In developing this analysis, we held a reflexive stance to understand how our experiences, biases, and background—as Costa Rican economists and internationalist professionals working in an academic institution—might influence the interpretation of the data, ensuring that it is as faithful as possible to the participants' perspectives. We applied deductive coding to the interventions using the Donabedian model, categorising them into modifications related to structure, processes and outputs/outcomes.²² KIs did not participate in designing the study, interpreting the results, writing the findings or reporting the research. The results are presented with supporting quotations from KI interviews and guided by the Consolidated Criteria for Reporting Qualitative Research guidelines.²⁴

In the second phase, we validated the qualitative data from the desk review and KIs with quantitative data on three dimensions. First, we address the outputs and outcomes of the CCSS between 2014 and 2022 (CCSS, 2019, 2020). Second, deaths according to the ICD-10 were recorded from 2014 to 2022 from the Costa Rican National Institute of Statistics (INEC). The third is monthly outpatient consultations during 2020.²⁵ We used

the quantitative data to confirm what the KIs mentioned and assess the potential impact of the responses.

There was no patient or public directly involved in the study.

COSTA RICA'S STRATEGY TO MAINTAIN EHSS

This section outlines the CCSS interventions used to maintain EHSs during the COVID-19 pandemic (see figure 1 for a summary of our main results).

Changes in structure

Creating a specialised COVID-19 centre

During the pandemic, the National Center for Rehabilitation (CENARE) was transformed into the Specialised Center for COVID-19 Patients (CEACO), a dedicated COVID-19 hospital. The transformation took less than two weeks, thanks to considerable interinstitutional and intrainstitutional effort.²⁶ The head of the CEACO mentioned that '...we achieved the goal of getting 50% of CEACO up and running in 234 hours and 39 min...in fact, 100% of the beds were ready in 300 hours' (personal communication, 15 February 2022). The CEACO started operations on 2 April 2020, less than one month after the detection of the first COVID-19 case in Costa Rica, and the patient received COVID-19 patients until November 2021. Overall, 2840 COVID-19 patients in severe and critical condition received healthcare at the CEACO, which represented 34% of the 8425 patients who required admission to an intensive care unit (ICU) during 2020.²⁷

Hiring interim health workers throughout the system

The CCSS authorised the creation of 784 job positions for the CEACO and strengthened its primary care network of clinics and national hospitals by adding 4023 new authorised jobs to face the pandemic.²⁸ Altogether, the CCSS authorised the hiring of more than 5 000 new temporary workers, representing an approximately US\$12.5 million budget in 2020. The pandemic generated the need to hire additional temporary personnel of all types (eg, physicians, nurses, administrators, and miscellaneous) to maintain EHSs and effectively address the fight against COVID-19. However, access to some types of specialist physicians, such as internal medicine and intensive care doctors, was limited, denoting the need—for the country and the CCSS—to invest in developing certain specialists.

According to data from the Human Resources Department of the CCSS, the number of temporary health workers in the CCSS increased much faster than the prepandemic trend, while the number of permanent workers maintained its decreasing trend. From February 2020 to January 2022, the number of temporary staff of the CCSS increased by 11% (from 39 785 to 44 173) due to additional interim health workers whom the CCSS hired to meet the increased demand for care for COVID-19 patients (see online supplemental figure A4).

Operating 24/7 call centres for follow-up on COVID-19 patients

A call centre provided 24/7 remote monitoring of COVID-19 patients, reducing in-person visits and

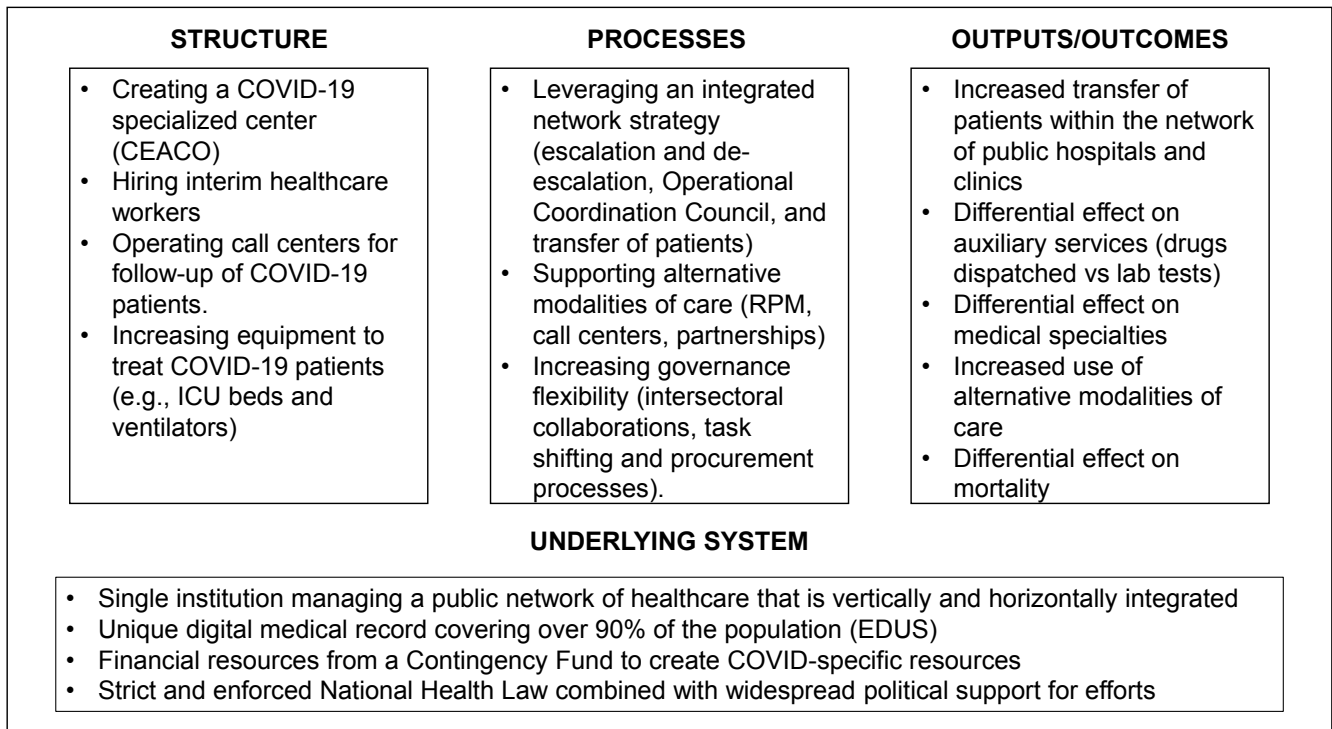


Figure 1 Donadebian model of interventions implemented by the CCSS that allowed the maintenance of essential health services during COVID-19. CCSS, Costa Rican Social Security Fund; ICU, intensive care unit; RPM, remote patient monitoring. Source: own elaboration.

hospital admissions. The call centre received an average of 600 calls per day and answered by 50 doctors guided by strict protocols. The CCSS's emergency line provided (1) follow-up calls to patients diagnosed as positive by the health areas, (2) daily monitoring of patients referred by a health area and (3) identification of patients who required hospitalisation. The call centre aimed to be the first contact with COVID-19 patients, hence contributing to timely isolation processes.²⁹

Increasing the number of ICU beds

The CCSS expanded its ICU bed capacity from 24 in January 2020 to 359 by December 2020.³⁰ While this capacity expansion delayed hospital saturation throughout 2020,^{31 32} the country faced limitations in the available number of ICU beds twice during 2021. The occupancy rate of COVID-19 ICU beds increased from 94% by April to 121% by May and to 145% by June when there were more than 500 patients in ICU beds out of the 359 ICU beds available.^{33–36} This overoccupancy impelled health workers to decrease the quality of attention and forced hospitals to allocate ICU beds from other healthcare services to COVID-19 patients, to prioritise certain critical patients, and to assign some critical patients to severe or moderate beds.^{37 38}

Altogether, a contingency fund created in 2016 financed most of these changes in structure. This fund provides monetary resources to the CCSS in the case of disasters such as earthquakes, floods or fires affecting health service delivery. During the pandemic, the

contingency fund received additional investments from the Central Government of Costa Rica and loans from international finance institutions. This contingency fund financed most of the US\$101 million (US\$1=CRC640) adaptations that the CCSS underwent throughout the pandemic.^{39 40}

Changes in processes

The CCSS adopted administrative procedures, internal decision-making processes and mechanisms to provide patients access to health, seeking to maintain EHSs during the COVID-19 pandemic.

Leveraging an integrated network strategy (One Caja)

The CCSS used an integrated network strategy called 'One Caja' to coordinate resource allocation and patient transfers during the COVID-19 response. This strategy emphasised an integrated approach across all the CCSS levels and facilities, redistributing resources based on availability.

To redistribute resources, the CCSS designed a response strategy based on the country's epidemiological situation. The strategy defined priority steps that gradually distributed the institution's resources and services between COVID-19 care and EHSs for other pathologies, between regions and between care centres.⁴¹ Eight phases determined transition processes, four toward ordinary care (de-escalation) and four towards increased COVID-19 cases (escalation). For example, during a peak of COVID-19, the escalation phases defined how

the CCSS substituted resources and hospital capacity in specialised centres, such as the CEACO, and the adapted spaces for COVID-19 care at the psychiatric hospital, from EHSs care to COVID-19 care. During the COVID-19 pandemic, COVID-19 care was concentrated in a high-capacity national hospital. In addition, the temporary interventions expanded the response capacity to serve patients from the health region and, if possible, from other nearby health regions to reduce the waiting list. The waiting list coordinator mentioned that actions had been taken to ‘maintain care as far as possible and take advantage of time windows when cases [of COVID-19] are decreasing. We have also increased the number of consultations, and now we are entering into a more aggressive recovery process’ (personal communication, 16 February 2022).

The Operational Coordination Council (OCC) played a key role in decision-making and resource coordination. The OCC is composed of directors of regional and national hospitals, directors of health areas from all over the country, and directors of six management positions from the CCSS’s headquarters (eg, logistics, technology, human resources, finance). Initially, the OCC transitioned from monthly in-person meetings to weekly online meetings when COVID-19 arrived in Costa Rica. The OCC facilitated internal communication, enabling the referral of non-COVID-19 patients to different hospitals and allowing COVID-19-affected areas to focus on increased patient demand. The OCC improved and strengthened coordination and communication channels within the CCSS.

Additionally, the CCSS’s integrated network management strategy also developed strategies for transferring COVID-19 and non-COVID-19 patients between hospitals in the network and between the various levels of care. The CCSS took advantage of the fact that the pandemic affected certain regions differently, so it was possible to redistribute COVID-19 patients between different areas of the country. Aiming to make efficient use of the available resources, the institution also created a communication infrastructure specialised in making emergency transfers for COVID-19 patients. The communication infrastructure included a health worker team (known as PRIME) and a communications centre (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 across the country to the CEACO and vice versa. This was important given that some clinics and hospitals in rural areas were not equipped to handle large numbers of COVID-19 patients in serious conditions. The COV-19 team focused on finding available beds in the system for COVID-19 patients, hence contributing to maintaining EHSs by allowing the system to avoid hospital overcrowding and the collapse of hospital care, helping maintain EHSs while preventing hospital overcrowding and collapse.⁴² According to the waiting list coordinator, ‘the PRIME and the COV-19 team were very successful in

the sense that no one was left without a bed, even in the most acute part of the emergency’ (personal communication, 16 February 2022).

The transfer of non-COVID-19 patients had some interruptions during the pandemic, mainly because of capacity restrictions inside ambulances. For example, the director of an oncology patients’ association mentioned that ‘[before the COVID-19 outbreak]...the CCSS routinely transferred up to six patients by ambulance between health facilities, many of which were people without [economic] resources; however, once the COVID-19 pandemic began, so many patients could not come in one ambulance’ (personal communication, 8 February 2022).

Supporting alternative modalities of care

During the early pandemic, an institutional mandate aimed to reduce in-person attendance at facilities, enabling the scale-up of alternative care methods, including remote patient monitoring (RPM), COVID-19 patient call centres, and medication delivery to patients’ houses. These measures facilitated remote outpatient visits, especially for chronic patients, reducing the need for in-person healthcare visits and minimising infection risks for both patients and health workers.

RPM enabled health workers to conduct remote visits via telephone or video calls, although it faced challenges such as patient absenteeism due to technical barriers. KIs reported during the interviews that even though patients scheduled appointments, they did not answer the phone or did not have a data plan to access the video call; others required help given technological gaps in the use of smartphones and video call applications. Despite this, the RPM proved valuable for certain specialties that did not require physical examinations. Additionally, RPM facilitated postdiagnostic follow-up once laboratory results were available in the electronic medical records (the EDUS), further reducing nonurgent in-person visits. While these telemedicine projects were scaled up, they also highlighted challenges related to healthcare equity and quality, particularly for services that necessitated in-person attention, such as surgeries.

Complementing RPM, a temporary initiative involving home delivery of medications was made possible thanks to a collaboration between the CCSS and other organisations. This initiative primarily benefited patients with chronic conditions, reducing their need to visit CCSS pharmacies. However, the quality of care and equitable access to these alternative modalities raised concerns among the KIs. Challenges included healthcare providers’ limited experience with these tools, insufficient quality control and barriers to accessing technology for low-income patients. Despite the benefits of telemedicine, patient associations noted feelings of neglect in the absence of in-person doctor visits.

Data played a crucial role in decision-making, supporting the One Caja strategy and the implementation of alternative modalities. The EDUS provided doctors and directors

with real-time data on bed availability and individualised medical records in different health facilities. The OCC analysed the EDUS-generated information to optimise patient and resource allocation across the network, both for COVID-19 and non-COVID-19 patients. For instance, the CCSS Medical Manager expressed that ‘...thanks to the EDUS, I could know, from the central offices, the real occupancy of each hospital and see how many beds there were and what type of beds they had. The EDUS worked as a control tower providing real-time information on the situation at the national level... Every day I could ask for a report that would tell me, for example, we currently have 100 patients in ICUs, 50 of these patients are complicated, and we have seven beds left. The OCC shared this information daily with all hospital directors’ (personal communication, 10 February 2022).

Increasing governance flexibility

In response to the state of emergency, internal processes were adapted to facilitate expedited decision-making, streamlined procurement and improved coordination within the CCSS, a highly bureaucratised and unionised organisation. Virtual meetings were introduced to enhance communication among administrative teams and decision-makers, simplifying information sharing. Procurement procedures were also streamlined to expedite decision-making, eliminating the need for traditional bidding processes.

The CCSS improved resource allocation and flexibility by mobilising health workers according to the system’s needs. To prevent the loss of staff when moved by health areas and hospitals to another health facility to attend the pandemic, health facilities were authorised to temporarily hire replacements, ensuring the continuity of EHSs. Task shifting (the rational redistribution of tasks among health workforce teams⁴³) also allowed for the reassignment of health workers to more critical roles during emergencies, demonstrating the need for flexible job descriptions in health workers’ contracts. Through task shifting, the CCSS reassigned highly qualified health workers whose regular duties were not a priority or who were high-risk services (eg, dentistry) to perform other tasks, such as providing general consultation or administrative support, to make more efficient use of the available human resources for health. This reassignment was in direct contrast to the WHO’s vision of task shifting, where specific tasks are moved from highly qualified health workers to those with less training and fewer qualifications. As an alternative, the directors opted to follow the logic of ‘if you can do complex consultations being a specialist, you can also do consultations as a General Physician’ (personal communication, 4 February 2022). Despite the centralised staffing coordination strategy within the system, there were differences between central and rural regions in terms of supplying medical personnel to health facilities in remote areas. For example, a rural health area director mentioned that ‘national hospitals absorbed many doctors and health

professionals, but all levels and almost all health facilities required more health professionals’ (personal communication, 30 October 2021).

Management processes were modified to respond urgently to the pandemic, especially in procurement procedures for critical items such as personal protective equipment (PPE). The rationing and reuse of PPE became necessary due to supply shortages. Fast-track procurement procedures were temporarily authorised to expedite decision-making.

Intersectoral collaborations, such as the ‘Abastecimiento Local de Equipo de Protección Personal’ initiative, aimed to produce PPE locally. Other collaborations, such as the Proactive Testing Campaign and medication home delivery, were established with various organisations, demonstrating successful efforts to maintain EHSs while protecting staff and patients.

Changes in outputs and outcomes

This section describes changes in outputs and outcomes, relating them to structural and process changes. The outputs are immediate results, and the outcomes are second-level results. [Table 1](#) compares the 2019 and 2020 output and outcome levels, and in online supplemental file 1, we present figures with annual time series data from 2014 to 2022.

COVID-19 disrupted routine work at the first level of care, impacting the follow-up of diseases and health promotion tasks due to personnel shortages. Health workers reduced patient care during the pandemic’s early stages, affecting referrals, counter-referral and follow-up for conditions such as high blood pressure and diabetes. Mobility restrictions and school closures strongly affect vaccination programmes in schools (such as vaccination against the human papillomavirus). KIs reported that emergency visits increased with patients previously treated at the primary level, such as decompensation for blood sugar levels or high blood pressure, and patients seeking medical attention in critical conditions, including increased cases of heart attacks.

Process changes, including the integrated network strategy, led to an increase in the rate of patient transfers between CCSS hospitals and clinics, which increased by two-thirds between 2019 and 2020 (see [figure 2](#)).

Changes in structure and processes also influenced auxiliary services. While the home delivery of medicines programme prevented a substantial decrease in medication dispatches, there were no partnerships for home delivery of other auxiliary services such as laboratory tests (see online supplemental figure A5). A reduction in laboratory tests was attributed to patient concerns about attending appointments during the pandemic. A coordinator of the cancer patients’ forum described the fears that the population had, including ‘... fear of dying from COVID-19 in the case of the population at risk. Fear of dying alone due to the isolation of patients with COVID-19... Fear because they did not know the next steps they had to take’ (personal communication, 8 February 2022).

Table 1 Outputs and outcomes of the Costa Rican Social Security Fund between 2019 and 2020

Indicator	2019	2020	Percentage change (2019–2020)
Percentage of hospital discharges transferred to another public hospital	1.8	3.0	+66.4%
Medicines dispatched per 100 people	1 830.0	1 751.0	−4.3%
Laboratory tests per 100 people	1 296.9	1 027.4	−20.8%
X-rays per 100 people	46.2	29.3	−36.7%
Medical visits per 1000 people	272.5	254.9	−6.5%
Surgeries per 1000 people	178.9	134.7	−24.7%
Cardiology visits per 1000 people	22.5	19.3	−14.4%
Oncology visits per 1000 people	9.2	9.9	+7.6%
Orthopaedic visits per 1000 people	40.1	29.8	−25.9%
Ophthalmology visits per 1000 people	41.6	28.3	−32.1%
Odontology visits per 1000 people	469.3	144.3	−69.2%

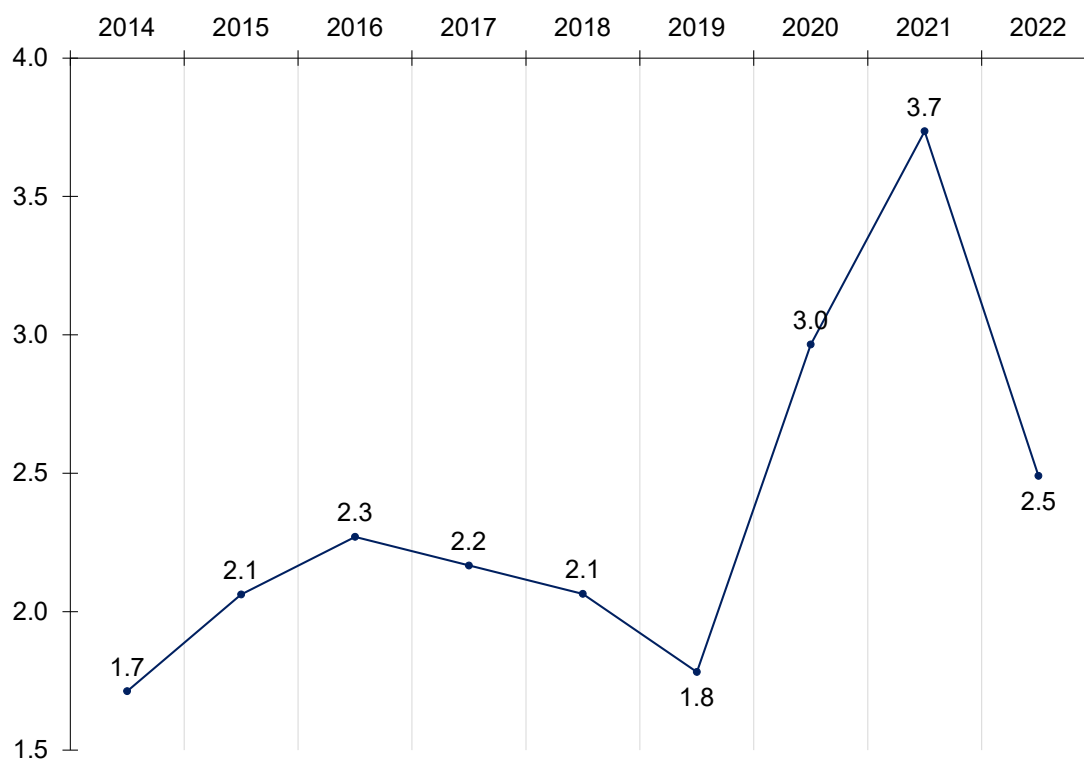
Source: Own elaboration from ⁴⁵.

A communication strategy emphasising staying at home and mobility restrictions resulted in a generalised fear of visiting healthcare facilities and reduced consultations in some services.

Supporting alternative modalities of care led to a rapid shift from in-person to remote medical consultations after Costa Rica's first confirmed COVID-19 case (see figure 3). Supporting alternative modalities of care contributed to sustaining some but not all EHSs, given that some procedures (such as surgeries) can only be provided in person (see online supplemental figure A6). The mandate to

reduce in-person medical attention differentially affects medical consultations by specialty. Between 2019 and 2020, medical visits to cardiology and oncology specialists decreased. In contrast, orthopaedics, odontology and ophthalmology—which can only be provided in person and may be less life-threatening in nature—were heavily affected (also see online supplemental figure A7).

Figure 4 compares the average number of deaths nationwide from 2014–2019 to 2020–2022 according to the ICD-10. Infectious and parasitic diseases showed the most significant increase (+830.4%), followed by


Figure 2 Percentage of hospital discharges with a transfer to another public hospital (2014–2022). Source: own elaboration from ⁴⁵.

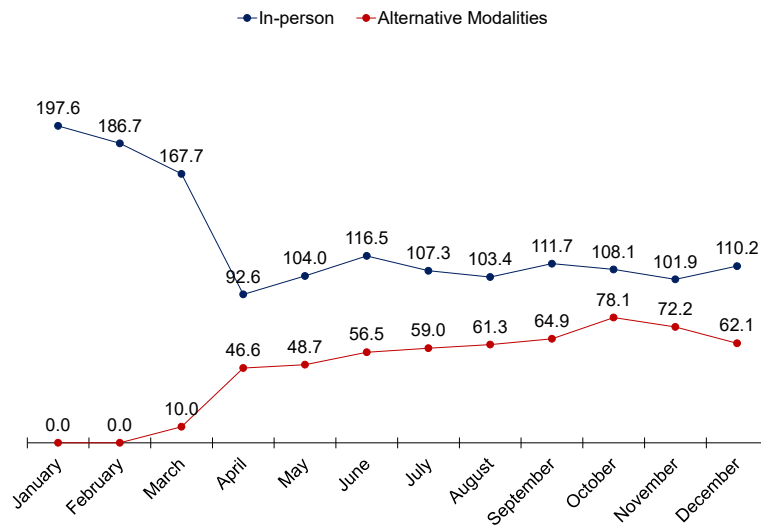


Figure 3 Monthly outpatient visits, in-person versus alternative modalities per 1000 people, during 2020. Source: own elaboration from ²⁵.

endocrine (+93.1%), mental disorders (+72.5%) and blood diseases (52.0%). Alternative care modalities helped some patients, but not all.

Our desk review and KIs interviews suggest that neither the CCSS nor the government had an official list of what constituted EHSs. Nevertheless, there was an implicit prioritisation process when the institution mandated reducing in-person services, and only certain services, such as ER, respiratory, cardiology and oncology services, remained active. Other services not implicitly considered a priority were heavily affected (eg, orthopaedics, odontology, ophthalmology and dentistry) or delivered virtually.

Enablers

Individually analysing changes made by healthcare systems to respond to COVID-19 is necessary but does

not provide the whole picture for pandemic preparedness. Hence, we also go beyond describing specific structure and process changes and try to understand the enablers in the local healthcare system that allowed those changes to be possible or effective. We identified three key enablers.

First, the CCSS is a single institution that oversees a network of hospitals and clinics nationwide, covering more than 97% of the population. This integration enables a coordinated response to both COVID-19 and regional outbreaks. Notably, during the pandemic, the flexibility given to the CCSS, because it is a single and integrated healthcare system, distinguished it from fragmented ones (ie, many different health ‘subsystems’ coexist, providing care for different parts of a country’s population; each of these subsystems has its own way of

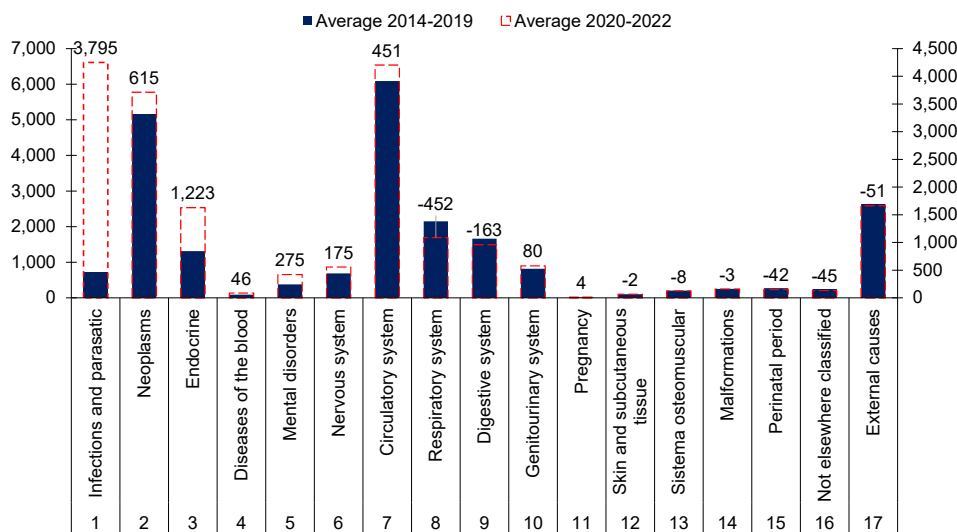


Figure 4 Number of deaths by International Classification of Diseases version 10 (ICD-10) chapter, 2014–2019 average vs 2020–2022 average. The data label shows the absolute change between the 2014–2019 average and the 2020–2021 average. Source: own elaboration from online query to ⁴⁶.

financing and delivering healthcare, and each provides healthcare to different types of people), such as in New York, where challenges arose due to the lack of coordination across different health providers.⁴⁴ The CCSS Medical Manager mentioned the importance of network management of the system; for instance, ‘I saw what was happening in other places, for example, what the governor of New York said, that he would have liked all the hospitals in New York to operate at the same time and in the same way. At a certain moment, not only were some hospitals filled to the brim and others not as much, but they also belonged to different systems. They didn’t have the flexibility we have’ (personal communication, 10 February 2022).

Second, the EDUS plays a vital role in patient follow-up, service continuity, and efficient patient transfers within the healthcare system. The EDUS facilitated data sharing among health facilities, supporting a coordinated response. These data encompass epidemiological statistics and resource availability at the regional level, such as the number of beds, number of physicians, number of ambulances, UCI capacity and testing capabilities. The successful implementation of the EDUS relies on appropriate administrative processes and governance structures to support decision-making.

Finally, the availability of financial resources, including a contingency fund, bolstered the pandemic response. However, recognising that not all healthcare systems can establish such funds, it is crucial to explore alternative funding sources and potential intersectoral collaborations to prepare for the future crises.

Our paper has strengths and limitations. One of the strengths is the broader understanding of the decisions made and the processes followed to maintain EHSs. We went beyond analysing statistics and performance indicators through the dominant qualitative nature of the data and analysis. One limitation of our paper is that the CCSS did not have an explicit definition of what the institution considered EHSs, which limits our research approach.

CONCLUSION

During a pandemic, health systems must also seek to maintain EHSs for patients with diseases or conditions other than COVID-19. Changes in the CCSS’s structure and processes due to COVID-19 influenced its ability to sustain EHSs. Responding to the pandemic was determined not only by decision-makers during the crisis but also by enabling factors often defined in the middle or long term—before the outbreak. Thus, there is a need for health systems to understand these enabling factors and the tools at hand that could increase their resilience to future pandemics and develop crisis management plans that would allow them to respond more effectively to a pandemic while maintaining EHSs.

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