Knowledge Brief

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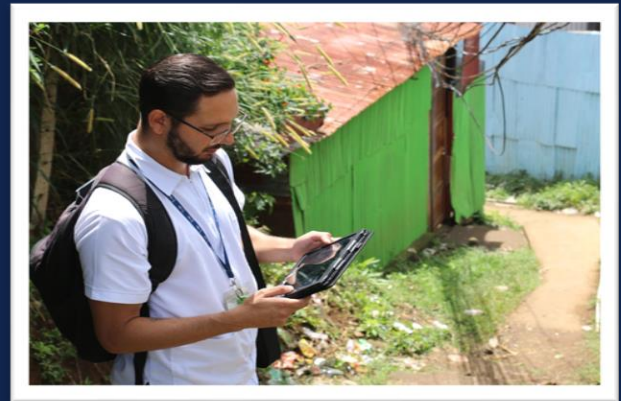Health, Nutrition & Population

Health, Nutrition and Population Global Practice

The Integrated Family Record System (SIFF), a Key Tool for Monitoring the Social Determinants of Health in Costa Rica

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KEY MESSAGES:

- The family record, historically implemented at the primary health care level in Costa Rica, collects socioeconomic and health information and has become a key tool in the multisectoral strategy to address challenges that threaten the health of the population.
- Recently, the digitization of family records into the Integrated Family Record System has boosted the benefits to the direct users of the tool, to the operation and administration of the Costa Rican Social Security Fund (CCSS), as well as to institutions of social interest in the country for the priority monitoring of vulnerable populations.
- The integration of data collection through electronic tablets has allowed the georeferencing of the country's homes, an important step that will generate information on the concentration of epidemiological profiles and risk maps by communities and will facilitate the management of future epidemics and natural disasters.
- This project was implemented quickly and achieved a high level of coverage in housing digitization prior to the COVID-19 pandemic. Barriers to implementation have been addressed through teamwork and institutional support and commitment.
- The great benefits of SIFF are still incipient, as its immense potential through the georeferencing of dwellings will be fulfilled in the coming months.

Introduction

In a period of 7 years, Costa Rica achieved the digitalization and automation of the Ficha Familiar, an instrument of the first level of care that provides socioeconomic and health information of households and families in the country and that had been recorded on paper for almost four decades.(1) This technological tool, now called Integrated Family Record System (SIFF, for its name in Spanish, Sistema Integrado de Ficha Familiar), promotes the strengthening of Costa Rica's Universal Health Insurance by providing real-time information on the health of Costa Ricans. This allows to know the socio-demographic characteristics of the population and its distribution in the national territory. It detects risk factors (social and health) in families and thus allows the early detection of vulnerable users, identifies groups that require greater attention in terms of prevention and facilitates their expeditious and safe referral to other levels of health care or other social services. At the same time, in operational terms, it made information records much more efficient by reducing paperwork and simplifying procedures, facilitating the monitoring of data quality.

SIFF's digital transformation was driven through the Program for Results (PforR), a World Bank financial instrument that incentivizes the achievement of strategic objectives and goals of programs in which governments

seek to improve the use of general public expenditures or improve their performance using their own processes and institutions. In Costa Rica, this program ran from 2016-2023 for the Strengthening of Universal Health Insurance. Its initial objectives included modernizing and strengthening the primary health care network, improving the quality of services, increasing population coverage, and making the network more capable of prevention, early diagnosis, and control of diseases relevant to the local, national, and regional epidemiological profile. In addition, the objective was also to improve the institutional and financial efficiency of the Costa Rican Social Security Fund (CCSS, for its name in Spanish, Caja Costarricense de Seguro Social), the main provider of health services in Costa Rica.(2)

The World Bank's support not only made it possible for 100% of Costa Rican homes to be digitized in the family record information system, but has also been an important catalyst for the geo-referencing of more than 60% of Costa Rican homes to date. This digital transformation success was also possible thanks to the digital transformation ecosystem that the CCSS is experiencing. In addition to a great institutional commitment and will that underpinned the necessary resources and transformation management at the institutional level. It is also the result of an enormous effort to overcome the barriers encountered in the implementation of a paradigm shift in the method of collecting information from the family records.

This knowledge report, part of a broader series of knowledge reports developed by the World Bank, seeks to describe the main reasons for success, challenges and key lessons learned during the digitization of the SIFF, with the objective of providing a roadmap for other countries interested in implementing similar programs.

Background

The identification of the health needs of the Costa Rican population at the community level has been present in Costa Rica for more than thirty years.(3) In the 1990s, rural health care assistants (4) visited their assigned homes and collected indicators on the characteristics of the residences and the people assigned to their sectors, these being the basis of the family record. The data collected by the assistants served as input for the creation of balance sheets and statistical reports on the population in those territories. The recognition of the relevance of this information, as well as the interest in automating the process, led some health areas at the

beginning of the 21st century to create digital files of these databases so that the Technical Primary Health Care Assistants (ATAP, for its name in Spanish, Asistentes Técnicos de Atención Primaria) could fill in the information in the Family Record on their return from field visits. (5) This digitization of the information allowed a better analysis of the data at the local level, but they were isolated databases and lacked computer security.

Figure 1. ATAP in community. Credits: CCSS, 2022. (6)

The Integrated Family Record System

In 2015, SIFF progressed and was integrated into the Single Digital Health Record (EDUS, for its name in Spanish, Expediente Digital Único en Salud), an institutional repository of patient data in digital format that has enabled the security and interoperability of information among the three levels of health care, including that of SIFF.

Currently, there are two ways to enter information into SIFF; the computer version called SIFF Web, and the version for portable tablets known as SIFF Mobile (Figure 2). The latter allows the portability and updating of information through an electronic tablet. Its main added value is georeferencing, a mechanism that generates an identification number for each home according to its geographic coordinates. This allows the CCSS to better control and monitor the demographic and epidemiological profiles of the country, in addition to facilitating the location of homes for future visits by the ATAPs.(7)

The SIFF houses geographic, health, and social determinants of health data. Specifically, housing characteristics (e.g., condition and type of floors and walls), electrical equipment, basic services available, number of inhabitants in the dwelling, and the health status of each family member (e.g., vaccinations given, vital signs, weight, height, disability). The inclusion of these variables was obtained from the family files of the

1990s and from governmental discussions on socioeconomic indicators of interest to reduce inequity gaps. In turn, a Users' Committee (composed mainly of SIFF coordinators at the national level) analyzes institutional needs annually, as well as the socioeconomic, demographic and epidemiological context, for the updating and inclusion of new variables. This review allows the data collected in SIFF to remain adapted to current needs.

Figure 2. SIFF Mobile interface Credits: CCSS, 2019. (8)

SIFF planning and implementation

The beginning of the implementation of the SIFF at the national level was titanic, since training in the digitalization of family records was carried out with visits to each of the health regions. With the arrival of EDUS and its political and economic backing, a SIFF Massification Project was established. This included the configuration of connectivity with cellular technology and training and support for the Regional Directorates (7 decentralized zones that provide local follow-up to the 105 health areas of the CCSS).(9)who were the managers of the implementation in their territories.(1) This SIFF Massification Project was achieved with the donation of 900 tablets and a projected average investment per year of USD 300K to manage the software and mobile connectivity.

The National Nursing Coordination is the technical body responsible for the SIFF program. This Coordination supports with the elaboration and validation of the regulations, as well as the guidelines on the regional management of SIFF (e.g., information security and follow-up of vulnerable patients). In addition, it monitors the registration and quality of information, with a leadership and supervisory role in the activities of the ATAPs.

In field implementation, the ATAPs are the link between the health system and the community. They visit all households in the country, including geographically inaccessible areas, using horses, boats, quadricycles, or long walks.(10) This has allowed an adequate approach and attention to the indigenous populations. During these home visits, the ATAP carries out health promotion and education activities and, together, records and updates the information in the Mobile SIFF. For their part, the nurses working in the community follow up on the scheduling and supervision of these home visits and provide ongoing training to the ATAPs. They also support the ATAPs with the care and referral of the most vulnerable patients and those with significant risk factors.
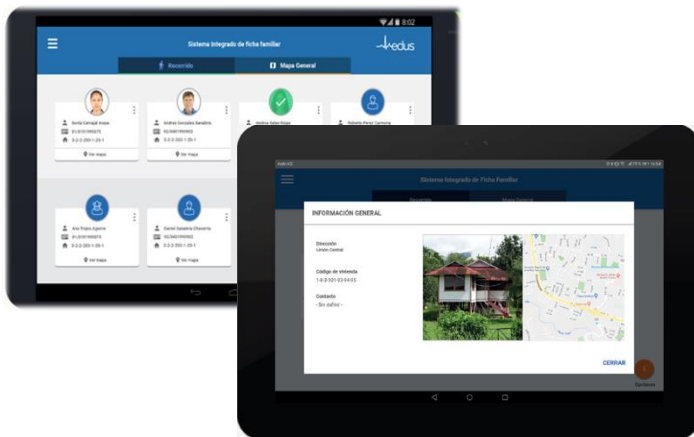
EVIDENCE OF INTERVENTION SUCCESS

Multiple facts demonstrate the success of the digitalization of the SIFF family file. Obviously, one of them is that 100% of Costa Rican households are currently integrated into the SIFF portal and nearly 67% are georeferenced. The different variables collected through the SIFF allow a prioritization at the three levels on the health risk of individuals and families in Costa Rica. (11) This means that, in theory, individuals can be visited in their homes three, two, or once a year, according to their level of risk.

In addition, the information collected can be visualized through statistical cubes, which are the predetermined outputs of the data contained in the family files. These cubes can be used at the institutional level for decision making, or by specific areas, such as statistics and epidemiology, for epidemiological surveillance, outbreak management, or emergencies. In due course, georeferencing will allow the CCSS to generate an analysis of the data, relating it to time, place, and person. This will generate information on the concentration of epidemiological profiles and risk maps by communities, as well as facilitate the management of future epidemics and natural disasters.

The value of the SIFF data is such that it even provides more updated information than the national population censuses and has allowed other social institutions to

benefit from and access the information, through the signing of confidentiality and information security agreements. Among them are the National Information System and Single Registry of State Beneficiaries (SINIRUBE) and the Mixed Institute of Social Assistance (IMAS), which use the information to grant economic assistance for the country's development.

FACILITATORS

There are several enablers that together have driven SIFF's digitization strategy.

The expansion of the Single Digital Health Record: The SIFF is integrated into the EDUS and as such, the growth strategy and implementation of this tool catalyzed the expansion of digital family records. Therefore, the necessary funding and resources, as well as the creation of infrastructure for internet connectivity, training and change management implemented in the EDUS, enhanced the digitization of the SIFF.

A solid primary health care system and its Ficha Familiar as a historical instrument: The various health promotion and prevention activities, implemented for decades in community care in Costa Rica, allow the digital introduction of the SIFF to be facilitated.(12, 13) In turn, the health care providers who now interact with the SIFF already knew the components to be collected within the family record, so the training and coaching focused exclusively on the use of the digital tool with computers and tablets and not on the explanation of the content of SIFF.
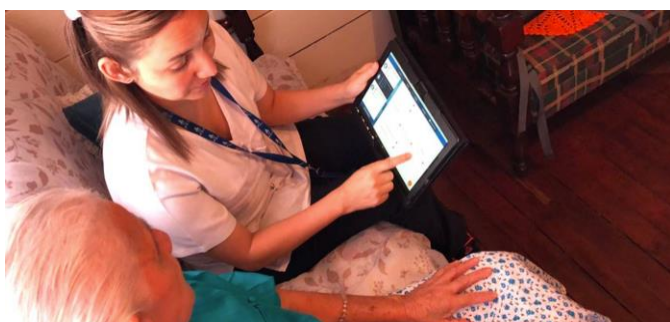

Figure 3. ATAP showing the SIFF Mobile to the patient at home. Credits: CCSS, 2019. (8)

The ATAP as a local and reliable agent: The historical existence of the ATAPs, as well as their close relationship of trust with the families and their extensive knowledge of the communities they serve (an essential aspect in the care of indigenous populations), has made the collection of information more efficient.(10) This element was key

when the CCSS digital system suffered a cyberattack in 2022, since the close relationship of the ATAPs with Costa Rican families made it possible to communicate the new security elements contained in the SIFF, so that people could once again trust the system.

Committed and empowered nursing staff: The National Nursing Coordination and its organizational distribution at the regional level positioned the nursing staff as leaders in the implementation of the SIFF and the accompaniment of the ATAPs.

Political will and commitment: The potential of the data contained in the SIFF has allowed the political will for the project to grow. The potential of the information for decision making and strategic plans of the CCSS has been better appreciated.(14)

SIFF publicity campaign: The CCSS informed the population about the change to digitalization of the SIFF and the added value this had for their health, through communication campaigns. This facilitated the acceptability of the use of the mobile SIFF in households.

Being an objective of the PforR: The housing data entry and georeferencing in the SIFF were part of the indicators promoted through the PforR, by common agreement between the CCSS and the World Bank. This ensured that the actions established were effective in achieving the projected goals and allowed the CCSS to commit and act swiftly to meet the objectives.

CHALLENGES ENCOUNTERED AND SOLUTIONS APPLIED

At the same time, several challenges have been encountered along the way that hinder effective implementation.

Human resources gap: The number of ATAP and nursing personnel at the first level of care per 10,000 inhabitants is below what is necessary to cover the population's demand. Although the SIFF allows for stratification of families according to vulnerability risk, the limited number of ATAPs available in the country restricts home visits to once a year, instead of two or three visits according to the degree of vulnerability risk stratification. Despite this, the basic health care team (EBAIS) provides closer follow-up to these individuals by having them identified in the SIFF.(15) Likewise, the CCSS is assessing the human resources needs at the first level of care. Based on these diagnoses, the aim is to increase the number of health personnel available to meet current

needs.

Balance in the management of ATAP activities: One of the main challenges has been the balance in time management between data collection and follow-up of health promotion and prevention activities carried out by the ATAPs. For example, it is difficult to schedule the duration of home visits, because there is variability in the number of family members to be followed up in the homes. Another example responds to epidemiological emergencies, such as the response to the care of imported measles cases during 2019, which paused data collection activities in the SIFF. Fortunately, the accompaniment and support to the ATAPs, by the nursing staff, has achieved a more effective balance between the management of their activities**.**

Figure 4. ATAP collecting vaccination card information in SIFF Mobile. Credits: CCSS, 2019. (8)

Technological advances and computer equipment failures: Rapid technological advances have caused portable tablets to become obsolete. In addition, there have also been casualties in these equipment due to breakdowns in accidents or loss of the devices. To meet these challenges, a second purchase of tablets is being planned. Likewise, the CCSS is creating physical forms compatible with the SIFF Mobile. These forms will be used to collect the information on paper, in the event of any device cancellations. Together, the regional chiefs, EDUS staff and the Nursing Coordination maintain constant communication and attend to failures in SIFF through a WhatsApp group.

Attention through contracts with third parties: Six health areas were not included in the first supply of electronic tablets, because they are served by contracts with third parties through purchases of health services made by the CCSS. The fact that these areas do not have SIFF Mobile (tablets) has prevented the georeferencing of 180,000 families. Fortunately, this will soon be resolved with the supply of devices to these areas through the

purchase of new equipment.

Resistance to digitalization: At the beginning, the ATAPs that did not know how to use computers or tablets showed fear and resistance to their use. This was gradually reduced through training on the tool and the change management component (interventions implemented in the EDUS expansion to facilitate the digital transformation process).

COVID-19 pandemic: Social distancing restrictions, as well as actions to address the COVID-19 pandemic (COVID-19 vaccination), paused for two and a half years the home visit activities of the ATAPs, including geo-referencing of households. Recently, in February 2023, the Medical Management of the CCSS instructed to resume home visits and related activities.

THE ROAD AHEAD AND THE GAPS TO BE CLOSED

The CCSS will continue to advance in the georeferencing of the country's housing. This will be achieved with the provision of tablets to areas served by third parties, with the requirement to be made in 2023. In total, about 1,600 tablets will be purchased, about double the first donation. This surplus of devices is intended to cover device replacements due to breakdown or loss.

In addition to continuing to ensure the quality assurance of the information, efforts will also be made to integrate establishments that are not currently being explored by SIFF, such as schools, nursing homes and community homes.

The future sustainability of the SIFF appears to be promising due to the richness of the universe of data it contains. This system will continue to prosper with the creation of the Directorate of Innovation and Digital Health of the CCSS, which will implement projects to improve the use of the data contained in the digital ecosystem of the institution. The potential use of SIFF data is much greater than what is currently used, so the creation of *dashboards*, heat maps and other methods of analysis that take advantage of georeferencing to visualize, manage and improve the offer of prevention and care services of the CCSS is envisioned.

The family record is a fundamental tool for improving the health of the Costa Rican population and the provision of CCSS services and can serve as an example for other countries (Box 1). Its digital transformation has benefited the efficiency of data collection and analysis, as well as the creation of an accurate diagnosis and timely follow-

up of the main determinants of health in communities. Its future development, together with the potential of georeferencing, will provide further inputs to continue improving the health of the population and reducing inequity gaps in Costa Rica.

Box 1. Lessons learned

- Institutional backing and political will are necessary to generate investment, a regulatory framework and economic resources that transcend political cycles for the sustainability of the project over time.
- Leadership and commitment to data collection in the field are indispensable to transform primary care.
- The training of health personnel is vital for the proper implementation of the tool.
- The population must be involved in the process and must be informed about the benefits of the project to be implemented.
- From the beginning it is necessary to guarantee the security of the databases and the information contained in the system.
- The SIFF was one of the objectives and intermediate indicators of the World Bank's Program for Results, which allowed the sector to focus its efforts and actions to meet the goals within the established timeframe.

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