

GLOBAL INFORMATION SOCIETY WATCH 2019

Artificial intelligence: Human rights, social justice and development



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Operational team

Valeria Betancourt (APC)
Alan Finlay (APC)
Mallory Knodel (ARTICLE 19)
Vidushi Marda (ARTICLE 19)
Maja Romano (APC)

Project coordination team

Valeria Betancourt (APC)
Cathy Chen (APC)
Flavia Fascendini (APC)
Alan Finlay (APC)
Mallory Knodel (ARTICLE 19)
Vidushi Marda (ARTICLE 19)
Leila Nachawati (APC)
Lori Nordstrom (APC)
Maja Romano (APC)

GISWatch 2019 advisory committee

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Valeria Milanés (Asociación por los Derechos Civiles)

Project coordinator

Maja Romano (APC)

Editor

Alan Finlay (APC)

Assistant editor and proofreading

Lori Nordstrom (APC)

Publication production support

Cathy Chen (APC)

Graphic design

Monocromo

Cover illustration

Matías Bervejillo

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COSTA RICA

AI APPLICATIONS TO HEALTH DATA AND CHALLENGES FOR THE RIGHT TO HEALTH IN COSTA RICA



Cooperativa Sulá Batsú

Kemly Camacho and Christian Hidalgo
www.sulabatsu.com; edus.ccss.sa.cr

Introduction

Costa Rica has a public universal health care system run by the *Caja Costarricense del Seguro Social* (Costa Rican Social Security Fund – CCSS), an institution that has been serving the country’s citizens for more than 75 years. It has a large structure with a total of 55,000 employees covering the entire Costa Rican territory.

Eight years ago, the CCSS began to develop the Unified Digital Health Record (*Expediente Digital Único en Salud* – EDUS). It consists of a set of applications and services that allows the automation of all health service delivery processes. The objective was to improve the quality of integrated health care for Costa Ricans by providing health professionals with easy access to all of a patient’s medical information and history.

We must understand that EDUS is not only a technical system but also a development programme that impacts positively on society in relation to the right to health. Using technology, it transforms and develops health service delivery institutions and processes with public funds. The richness of its data, which includes the medical histories of individuals and their families, in our view makes it one of the most important information resources in the country.

As the data collected by EDUS is expanded, artificial intelligence (AI) tools could play an important role in the exercise of the right to health in Costa Rica. However, the use of AI can introduce many risks too.

Context

To understand the potential of AI applications when it comes to EDUS, is important to highlight the following:

- EDUS applications are developed by the public sector, with public funds, and tailored to the Costa Rican population’s needs. In other

words, the Unified Digital Health Record can be considered a public good for people in Costa Rica.

- The Costa Rican health system is universal. This means that the databases managed by EDUS would contain all the information and health data of all inhabitants who have used the health system. Practically, this is nearly everyone in Costa Rica, including migrants of various nationalities. It is important to note that these databases are maintained in a private data centre.
- EDUS was fully implemented at the time we wrote this article. Currently its functionality includes digital filing systems, family health history and an appointment system, while additional functionalities include applications for emergency admissions or hospitalisation, links to pharmacies, and sharing medical images such as x-rays, ultrasounds and tomographies. This information is crucial in understanding the population’s health profile. EDUS has data on medical records, prescriptions, laboratory tests, medical images, and family health histories, among others.
- Costa Rica has a strong National Law for the Protection of Inhabitants’ Personal Data¹ and a national data protection agency.²

In previous reports, including our report for Global Information Society Watch (GISWatch) 2014,³ we analysed the risks of the EDUS platform in terms of data security. As the EDUS databases grow, the platform is becoming more and more interesting for private actors in the health sector (insurers, private clinics, pharmaceutical companies, etc.). Because of this, there is an urgent need to have better data privacy strategies and policies for the EDUS system.

1 <https://www.prodhab.go.cr//reformas>

2 www.prodhab.go.cr

3 Camacho, K., & Sánchez, A. (2014). Universal health data in Costa Rica: The potential for surveillance from a human rights perspective. In A. Finlay (Ed.), *Global Information Society Watch 2014: Communications surveillance in the digital age*. APC & Hivos. <https://www.giswatch.org/en/country-report/communications-surveillance/costa-rica>

The right to health and AI

The use of AI on the EDUS platform can make an important contribution to improving universal health care as envisaged by the CCSS. According to an EDUS staff member:

With data and AI applications, I believe that for the first time we can generate population profiles that can give value and real information to the medical sector, not only based on studies from other countries, but based on our reality. For example, we can predict the onset of a disease, its evolution, and the relationship between this and the habits of our population, etc.⁴

In this regard, over the next few years, priority will be given to actions aimed at the prevention and early care of chronic diseases that affect a majority of the Costa Rican population, as well as the decision-making process to strengthen the health infrastructure that responds to citizen health profiles. For this reason, one of the most important lines of work using AI on the EDUS platform will be the prediction of future health profiles from the analysis of existing data.

This has already started with the use of AI to analyse case studies, such as those documenting Type 2 diabetes mellitus. Through the application of AI, the future behaviour of this chronic disease can be predicted using existing historical information gathered over the last four years through the EDUS platform. The analysis seeks to identify groups of people who are at risk but are not yet sick, and promote strategies that allow prevention in the present, so that the disease does not manifest in these people in the future as predictions have indicated.

Another example where AI has been used in conjunction with EDUS is in the area of infrastructure. From the application of AI, it has been possible to identify potential public health challenges that will need attention over the next five years. For example, we are able to understand what population groups, given specific characteristics, face the challenge of teenage pregnancies, drug use, or mental illnesses, among others. This allows health authorities to build the necessary infrastructure and spaces to meet the future needs of these challenges, even before they have become evident.

For this, CCSS personnel have been trained in exploratory and predictive methods, building capacity in public health institutions for data mining and AI-enabled analysis techniques.

However, there are challenges to applying AI to the EDUS platform. The first one is related to the

National Law for the Protection of Inhabitants' Personal Data, which effectively qualifies EDUS databases as containing sensitive data, and therefore regulates and restricts their use. For this reason, the full potential of EDUS cannot be exploited for disease prediction using AI applications. This is an important area for national discussion: whether or not to create a special legal status for EDUS data and the use of AI applications in the health system without violating the individual rights and privacy of those using the system.

Secondly, although EDUS offers access to various datasets, the quality of this data needs to be ensured. This cannot yet be guaranteed since it is necessary to strengthen the processes and procedures that guarantee the quality of data. It is extremely risky to work with AI-based predictions if the algorithms use data that has not passed a rigorous quality process, because this can generate inaccurate predictions, result in wrong decisions, waste public health investments and present huge health risks.

Given the appropriate training processes and regulation of personal data respectful of personal rights, and with databases that guarantee the quality of the data, AI applications using EDUS envisaged in the very near future include “smart pharmacies”.

The development of smart pharmacies, where the entire process of preparation and distribution of medicines within a clinic or hospital would be automated, is based on the prescriptions issued to patients over time. Automated distribution of medicines to hospitalised persons using robots is also being contemplated.

The first stage has already begun to be developed at the Hospital de Heredia (Heredia is one of the provinces of the country) in a pilot project using a system called E-flow that has reduced delivery times. The medications likely to be required by a patient are automatically determined by means of predictive AI applications.

E-flow also analyses the operations of the public health pharmacy system, so that the headquarters can make decisions to transfer, at any given time, human resources to those tasks that had not previously been prioritised due to a lack of staff. For example, these might include educational and information campaigns on some of the topics that the hospital has defined as a priority for its patients. However, even if the need for resources is known, this may not always be possible. As Dr. Bastos, who works with EDUS, explained:

Artificial intelligence in relation to the prognosis of diseases can generate a breakthrough in making decisions in advance of the event and

⁴ Interview with EDUS staff member conducted for this report.

being able to prepare the health system before it happens. However, the questions to discuss would be: If I know how many and who are the future patients and I do not have enough resources, what decision should I make? Should all diseases be analysed or should I decide that some diseases should not be analysed? With the data I have, how will I respond to create real changes in public health? How do I follow up on patients?⁵

Bastos highlights a fundamental aspect of AI: the relationship between the results it determines, the decisions that need to be made by public institutions, and the availability of resources to respond to these needs that have been determined by the application. In terms of the right to health, this discussion is very important: the solutions proposed by AI applications may require decision making and action at a speed greater than the capacity of public institutions. This is a huge challenge and an important risk to highlight.

Another risk is an over-reliance on AI. Bastos told us:

In relation to robotics and AI, the challenge is to include processes that are not going to risk patient care. It should not be overlooked that every robot can potentially replace a human process. But robotics should rather strengthen the capacities and abilities of human beings to improve health care, as well as open up the new possibilities of employment or new positions that this can generate.

She raises several highly relevant aspects related to the exercise of the right to health when it comes to the human-robot relationship that will undoubtedly become more pressing questions over time. For example, which tasks should be replaced by AI applications and robots, and which should not? Is it possible to do this in a rights-based framework? What new rights need to be defined when humans interact with robots? These questions are already necessary with the use of chatbots for automated health consultations. For instance, are bots limiting the exercise of the right to health by having a limited number of preset responses for their users?

At the same time, while an important transformation in the health sector is seen through the incorporation of AI, this raises further important issues for health workers and practising professionals, including with regard to their training needs.

How will the work of health practitioners change given the use of AI and robots? Will some jobs in the health sector become precarious? What new forms of training are required? Moreover, what responsibilities will be assumed in terms of health decisions? Who will assume responsibility when mistakes are made by robots or algorithms? Will the companies who made the robots or the developers of the AI be liable? Or will the staff interacting with the AI be responsible?

When EDUS was integrated into the CCSS, an important process of change management had to be carried out with its personnel. The transformations that AI and robotics can produce in the health sector are even greater, so the adaptation of the public and universal health system and its staff to this new reality is something that should be reflected and acted upon now.

Conclusions

The case of EDUS in Costa Rica and the potential applications of AI are very interesting.

EDUS is an excellent system for the development of AI applications that strengthen the provision of health services.

These are AI applications that will be developed for the health sector – and therefore be a public good – using a database that is a public good as well. This is positive for the exercise of the right to health and is an example for the health systems in other countries.

At the same time, this implies the need for public action so that the applications of AI in health using EDUS have a legal basis, and include processes and procedures that guarantee not only the right to health, but also the public custody of the results generated by AI and the protection of national health data.

It is necessary to prepare the public health system for the incorporation of AI. It must be considered as a public management strategy with all that this implies. This should not simply be considered an issue of technological development, but also as the development of the health system as a whole, including changes to training and to work profiles, and how and under what conditions health services are delivered.

As the EDUS team indicates, “as long as the technology is used for the improvement of the health of the population and with the consent of the users, it can be a fundamental tool for the exercise of the right to health that has been promoted since the Costa Rican constitution was written.”

⁵ Interview conducted for this report.

Action steps

The following action steps are important in Costa Rica:

- It is necessary to incorporate key actors and citizen organisations in the discussion about the advantages and challenges of incorporating AI into public health. It is an extremely important issue for the exercise of the right to health that should not be treated only as a technological development.
- We propose that constructive, collective spaces must be established including a diversity of actors working on the right to health. These should feed into national decision-making forums deliberating public investment and the application of AI in the health sector.
- It is also necessary to demystify the technology and to make it understandable to the general population and to health personnel.
- It is important to continue developing actions to ensure the security of EDUS data, especially data that has already been collected for more than four years. It is currently in the custody of the CCSS, but with few digital security standards.

Artificial intelligence: Human rights, social justice and development

Artificial intelligence (AI) is now receiving unprecedented global attention as it finds widespread practical application in multiple spheres of activity. But what are the human rights, social justice and development implications of AI when used in areas such as health, education and social services, or in building “smart cities”? How does algorithmic decision making impact on marginalised people and the poor?

This edition of Global Information Society Watch (GISWatch) provides a perspective from the global South on the application of AI to our everyday lives. It includes 40 country reports from countries as diverse as Benin, Argentina, India, Russia and Ukraine, as well as three regional reports. These are framed by eight thematic reports dealing with topics such as data governance, food sovereignty, AI in the workplace, and so-called “killer robots”.

While pointing to the positive use of AI to enable rights in ways that were not easily possible before, this edition of GISWatch highlights the real threats that we need to pay attention to if we are going to build an AI-embedded future that enables human dignity.

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