

# Project for the incorporation of telehealth resources at the National Center for Medical Images in Costa Rica

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## Abstract

*This article aims to situate the context of the implementation of Teleradiology at the National Center for Medical Images in Costa Rica. The processes related to the satisfaction and demand of users from remote areas, outside the metropolitan area, will be reported, as well as the elements for the conformation of the Teleradiology service, depending on the demand and need, to achieve this improvement.*

## Resumen

**Proyecto de incorporación de recursos de telesalud en el Centro Nacional de Imágenes Médicas.**

*El artículo tiene como objetivo situar el contexto de la implementación de Teleradiología en el Centro Nacional de Imágenes Médicas en Costa Rica. Se informarán los procesos relacionados a la satisfacción y demanda de usuarios de zonas alejadas, fuera del área metropolitana así como se identificarán los elementos para la conformación del servicio en Teleradiología, en función de la demanda y necesidad, con la finalidad de alcanzar dicha mejora.*

## Resumo

**Projeto de incorporaco de recursos de telessade no Centro Nacional de Imagens Mdicas da Costa Rica.**

*Este artigo tem como objetivo situar o contexto da implementaco de teleradiologia no Centro Nacional de Imagens Mdicas da Costa Rica. Apresenta os processos relacionados a satisfaco e demanda de usurios de zonas remotas, fora da rea metropolitana, assim como os elementos para a configuraco do servio de teleradiologia em funo da demanda, necessidade com fins de alcanar melhorias.*

## Introduction

At the national level, health care programs have a series of evaluations and realities in scientific research and the development of new technologies in medical equipment such as information and communication technologies.

Progress in the development of new technologies at the institutional level allows the Costa Rican Social Security Fund to access telehealth in the different hospital attraction areas to provide remote medical care and to develop different institutional care systems without losing their quality and efficiency.

Compared with what we mentioned and to the topic we will develop, access to specialist medical services in radiology is slow, at least in the National Center for Med-

ical Images, but it is becoming a reality in the institution.

Currently, the CNIM provides care in the diagnostic service in medical images by magnetic resonance at the national level, in patients who daily attend the hospitals of the institution (CCSS), providing a diagnosis of the different systems of the organism.

Initially, with the incorporation of this technology, the institution managed to carry out advanced tests in medical imaging studies, favoring the diagnosis of 30 medical and surgical specialties, allowing a more precise determination of neurological injuries, cerebral vascular accidents, tumors, demyelinating diseases such as multiple sclerosis, vascular pathology, aneurysms, and arterio-venous malformations among others.

However, only through continuous evaluations within the Telehealth programs in the institution, in the medium

or long term, it would be possible to obtain objective data on a positive impact on Teleradiology.

Despite the limitations in the resources for the implementation of Telehealth, the institution makes giant steps towards achieving and developing a project, in which Teleradiology is carried out at the country level, including the National Center for Medical Images.

This article aims to situate the context of the implementation of Teleradiology at the National Center for Medical Images in Costa Rica. The processes related to the satisfaction and demand of users from remote areas, outside the metropolitan area, will be reported, as well as the elements for the conformation of the Teleradiology service, depending on the demand and need, to achieve this improvement.

## Method

This is a descriptive study. Initially, we carried out a characterization of the National Center for Medical Images within the Organization. Then, the scope of the services provided by the National Center for Medical Imaging was detailed, placing the context within the scope of care activities in Costa Rica.

Subsequently, the importance of a teleradiology project in Costa Rica was described, pointing out its potential to improve the services provided. We detail the benefits that could be derived from the incorporation of telehealth resources in the scope of the National Center for Medical Imaging.

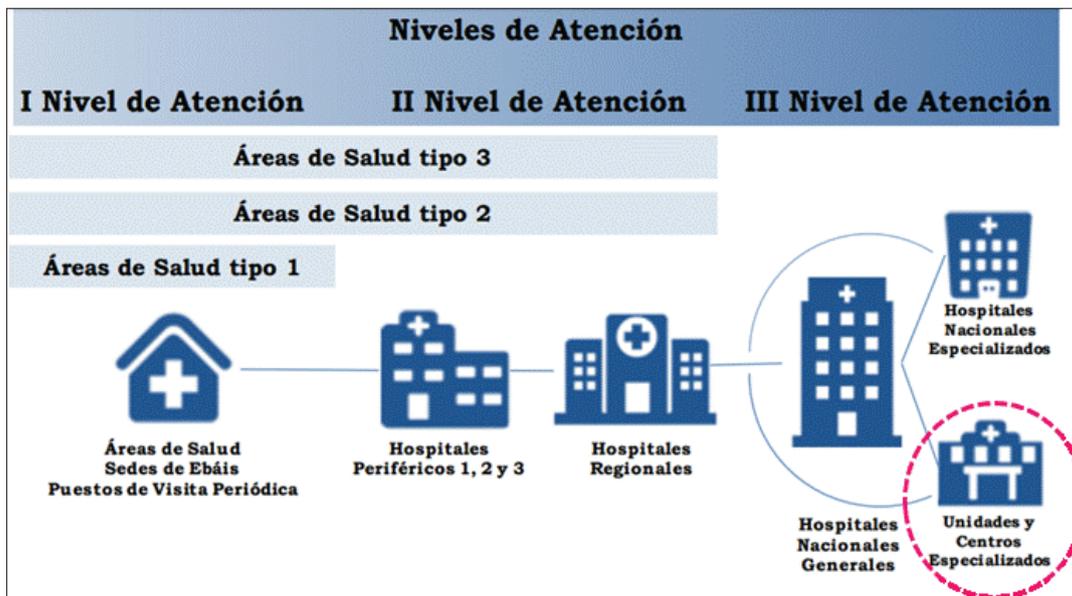
## Results

*Location and characterization of the National Center for Medical Images within the Organization (CCSS).*

The Health Services Projection Directorate (DPSS- Dirección de Proyección de Servicios de Salud), through the Health Services Analysis and Projection Area, locates the National Magnetic Resonance Center 2805, within the National Network; as part of the Inventory of Health Establishments attached to the Directorate of Specialized Centers of the Costa Rican Social Security Fund. This network includes the I, II, and III Level of Care, locating the National Center for Medical Images as a Specialized Center that provides national coverage.

In Illustration 1, Health Services Network Diagram, it is possible to visualize the care network to which this establishment belongs.

Figure 1: Health Services Network Diagram, Specialized Centers



Source: Inventory and Analysis of Health Establishments of the Costa Rican Social Security Fund, Department of Health Services Projection, Health Services Analysis and Projection Area. The consultation was made on 02/21/2019.

Table 1 shows the reference of Specialized Units and Centers and the categorization of the National Center for Medical

Images, within the National Network:

Table 1 Reference Units and Specialized Centers

II Level of Care	II Level of Care	III Level of Care	
		Hospitals	Units and Specialized Centers
Centers of Periodic Visit	Regional Hospitals	National General Hospitals	National Blood Bank
Ebais Headquarters	Peripheral Hospitals 1		National Center for Pain Control and Palliative Care
Health Areas Type 1	Peripheral Hospitals 2	National Specialized Hospitals	National Center for Medical Imaging
Health Areas Type 2	Peripheral Hospitals 3		Ophthalmological Clinic
Health Areas Type 3	Health Areas Type 2	Regional Hospitals	Molecular Human Genetics Laboratory
	Health Areas Type 3		National Cytology Laboratory

### Scope of the proposed services

The Center was inaugurated in 2011 and has two 1.5 teslas magnetic resonance equipment; favoring more than thirty medical and surgical specialties, throughout the national territory.

Table 2, Reference of the National Center for Medical Images, shows an extract of the characteristics that link this establishment, as a Specialized Center at the National Level.<sup>1</sup>

Table 2. Structure of the references of the National Center for Medical Images.

Reference	Specialized Center
Benefited population	It includes the entire population nationwide
Service Offer	Magnetic Resonance Studies
Business hours	Attention for carrying out studies: Mon – Fri 24 hours a day Sa 6:00 a.m. to 2:00 p.m.
	Administrative area: M-T from 7:00 a.m. to 4:00 a.m. / Fri from 7:00 a.m. to 3:00 p.m.
Human resource	Radiologists, Imaging Doctors, Patient Assistants, Administrative Staff, Cleaning and Surveillance Staff

Currently, the National Medical Imaging Center is located in the province of San José, Central Canton, El Carmen District,

50 meters north of the Emergency Tower of the Dr. Rafael Ángel Calderón Guardia Hospital.

The institution has been developing improvements in the development of new medical technologies, such as the National Center for Medical Images at the time, and later years the inclusion of projects such as incorporating a Teleradiology center, which would benefit the Costa Rican population, but despite the complexity, carries constant challenges, to provide care with high levels of standards and quality that is required to develop them.

In recent years, advances in computerized medical technology have benefited many patients in other countries of the world by shortening distances and allowing timely diagnoses within the reach of medical specialists. In other words, Teleradiology has become one of the services most developed of telemedicine in the entire world, and that the Costa Rican Social Security Fund, does not want to be left behind, aims to incorporate a center with computer equipment and communications of great magnitude and achieve the electronic transmission of radiographic images between two geographical locations of Costa Rica, for purposes of interpretation and consultations between specialists.

It is worth mentioning that political and regulatory support in the country plays a fundamental role in health projects, although it is understood that there are no properly established regulations that directly involve Teleradiology in the field of Telemedicine at the national level.

### **Teleradiology, a clinical need in Costa Rica**

Teleradiology in Costa Rica is not a luxury but rather a clinical need due to the high demand for diagnosis at the Institutional level (CCSS), the need for Teleradiology has grown due to the lack of medical specialists in radiology, mainly in remote areas. For this reason, radiology specialists are required to work from a telemedicine specialty center or their homes, managing to avoid unnecessary trips and frequent interruptions in their reading sessions, managing to reach more Costa Rican territory efficiently, and also achieving greater communication capacity with peers to get a second opinion or expert insight in some cases, as a clinical necessity.

### **Advantages that the CNIM would achieve with Teleradiology in Costa Rica**

We know that Teleradiology is a service provision model based on informatics and telecommunications focused on one of the components of telemedicine. Under this concept, the National Center for Medical Images would provide and support a greater transmission of radiological images of patients who are interpreted under the professional concept to the different corners of the country.

#### **Advantages**

- √ Process efficiency.
- √ Opportunity to deliver the studies.
- √ Optimization of processes in the radiology area.
- √ Effectiveness in existing health professionals.
- √ Greater coverage in the reading of results.
- √ Scope, greater national coverage
- √ Opportunity in making decisions to define treatments.

### **Implementation of care in Teleradiology proposed for the CNIM**

The investigation of a proposal in Teleradiology at the CNIM seeks to incorporate a model based on the integrality and improvement of the technological resources of information and national attention, in which it is necessary to articulate a strategy that optimizes the human resource and takes advantage of the installed capacity of diagnosis images in clinics and take advantage of clinical information systems, guaranteeing continuity of comprehensive management and timely diagnosis to the user.

### **Benefits for the Institution**

If it is possible to carry out the promotion of a Teleradiology Center in the Costa Rican Social Security Fund at an institutional level, we would be able to obtain multiple benefits as a center specialized in the development of new technologies in medical informatics such as:

- √ Increase the ability to carry out radiological reports.
- √ Improve reading times by studying.
- √ Opportunity for a second opinion.
- √ Improve the income of specialists (radiologists).
- √ Multidisciplinary work between the units of the institution from border to border.
- √ Reduce response times.
- √ Avoid increase in relative costs (transportation of patients).
- √ Improvement in times and responses in the delivery of results, among others

### **Conclusions**

The implementation of a project for a Teleradiology center at an institutional level (CCSS) for users would generate efficiency in care and resolution in diagnoses.

Implementing a project of abysmal magnitude would require a high investment. However, in the medium or long

term, the financial resources of the institution would be optimized in such a way that operational costs would be reduced, guaranteeing better quality services for the user regarding timeliness and effectiveness in the interpretation of diagnoses by the radiology professional.

The project would provide a solution to multiple problems such as the shortage of radiologists, timely medical care in distant areas, and the centralization of qualified specialists.

It would improve the management of indicators and measurement of medical productivity, profitability, quality, and safety in care.

## References

1. //intranet.ccss.sa.cr/Organizacion/GM/proyeccion/Publicaciones%20Varias%20Inventario/Organizaci%C3%B3n%20y%20Establecimientos%20de%20Salud%20de%20la%20CCSS%20al%2031-12-2018.pdf