

# The behavior of telemedicine in the health area Guatuso between the years 2010 and 2018

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## Abstract

*the article analyzes and records the behavior and development of telemedicine, as well as its benefits for a Costa Rica population during the period 2010 – 2018.*

**Keywords:** Telemedicine; Telehealth.

## Resumen

*Comportamiento de la telemedicina en el área de salud Guatuso entre los años 2010 al 2018. El artículo analiza y registra el desarrollo de la telemedicina, así como sus beneficios para una determinada población costarricense durante el periodo 2010 - 2018.*

**Palabras-clave:** Telemedicina; Telesalud.

## Resumo

*Comportamento da telemedicina na área de saúde de Guatuso entre os anos 2010 e 2018. O artigo analisa e registra o comportamento da telemedicina e seus benefícios para uma determinada população Costa*

**Palavras-chave:** Telemedicina; Telessaúde.

## Introduction

The Health Area Guatuso is part of the 104 primary care units that belong to the Costa Rican Department of Social Security, main public entity of health service delivery in Costa Rica. This area has a territorial extension of 758.32 km<sup>2</sup> and a population of 18608 inhabitants for the year 2018 according to data obtained by the National Statistics and Census Institute (INEC) and the Ministry of Public Planning (MIDEPLAN) public institutions of the government. Its inhabitants, mostly of indigenous origins has a medium-small socioeconomic level and dedicate themselves mainly to agriculture and livestock.

Its main reference center is the San Carlos Hospital that constitutes a II Level of attention, corresponding to the place with bigger specialization and permanence of medical specialists, located in Ciudad Quesada, where it is at a distance of 77 km. And, as specialized center or III level of attention it counts on the Mexico Hospital, located at 170 km from the Health Area.

According to the Pan-American Health Organization (OPS), telemedicine has an important role to provide accessible solutions to the socioeconomic problems of the health systems, which go from factors such as the ageing of the population and the increased demand in the health services; to problems of geographic distance and inequality.

In an article published in the Health Affairs magazine in February, 2019, Cinthya M. LeRouge, carried out a review of the use of Telemedicine in 9 Latin-American countries: Argentina, Chile, Colombia, Costa Rica, Guatemala, Mexico, Panama, Peru and Uruguay, the use of Telemedicine varies from 25% in Colombia to 65% in Chile, reporting a 26% in Costa Rica.

However, Costa Rica is found together with Argentina, Colombia, Peru and Uruguay among other countries that have an explicit policy and a national legislation that regulates the use of telehealth, policy that exists since 2012. With the following article we intend to document the development of Telemedicine in the Health Area Guatuso and the benefit to the consulting population, through adequate controls of attention, management of opportunities and case resolution. This article has as objective to document the development and the benefit of telemedicine in the Guatuso Health Area, during the years of 2010 to 2018, as well as to characterize the teleconsultations provided in the Guatuso Health Area, to establish the relation between production and used hours, to determine the main teleconsulted centers and to document the relation between consultation and medical discharges in the Guatuso Health Area.

## Objectives

### General objective

- Document the development and benefit of telemedicine in the Guatuso Health Area, during the years 2010 to 2018.

### Specific objectives

- Characterize the tele consultations provided in the Guatuso Health Area, by means of Year, Quantity, Hours used, Tele consulted specialties and Sex.
- Document the existence of tele consultations in other non-medical health disciplines during the study period.
- Establish a relationship between production and hours used for years of tele consultations of the Guatuso Health Area.
- Determine the main tele centers consulted by the Guatuso Health Area, during the study period.
- Document the relationship between consultations and medical discharges in the telemedicine program by period of the Guatuso Health Area.

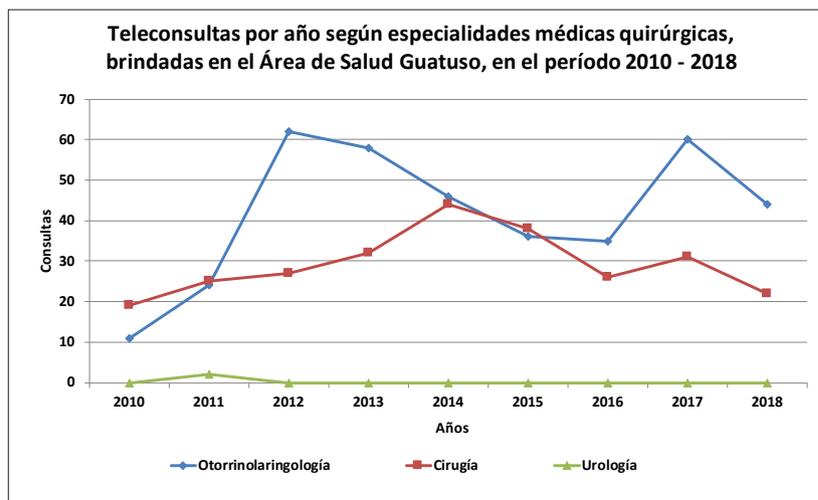
## Method

The following is an observational, descriptive and longitudinal retrospective study, based in the review of the production reports and auxiliary records issued by the service of records and statistics during the period of 2010 to 2018 of the telemedicine Program of the Guatuso Health Area and which relied on technologies such as Microsoft Office Excel 2007, Microsoft Office Word 2007.

It is important to indicate that said study will be carried out through the telehealth consultations' history of the Guatuso Health Area as teleconsulting center and the Hospitals Los Chiles, San Carlos, Mexico, Geriatrics and Gerontology National Hospital and the National Hospital de Niños as teleconsulted centers.

## Results and Analysis

Graphic 1

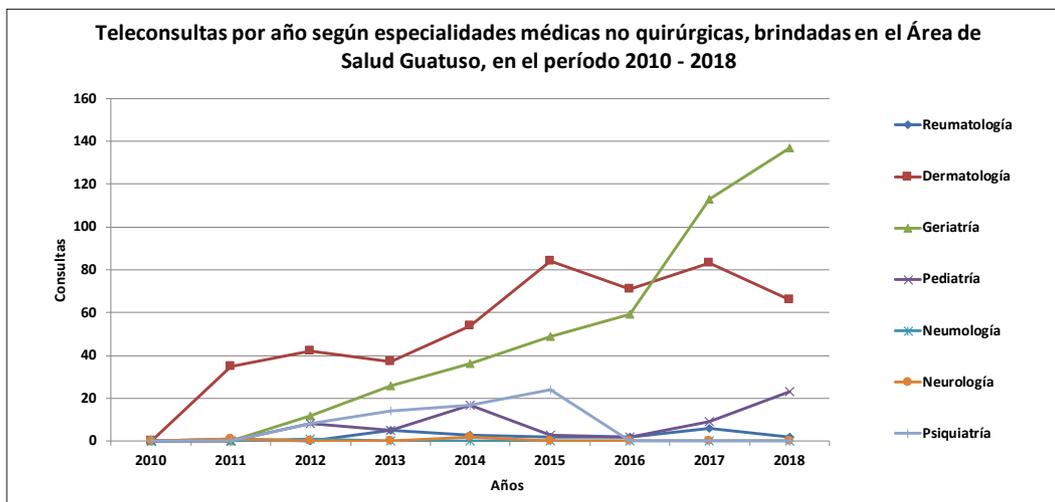


Source: Register and Statistics Guatuso Health Area

The services of dermatology, geriatrics, pediatrics, pulmonology, neurology, psychiatry and rheumatology are the main consulted ones in telemedicine. Dermatology and geriatrics are identified as the ones that have most regularity in the consultations, registering a general totality, during these 8 years of implementation, of 472 consultations for dermatological cases and 432 consultations for geriatrics, and in a lesser degree the remaining specialties which have been difficult to continue and stay permanent in the modalities of digital health;

At a comparative analysis it can be identified that throughout the years there has been a gradual raise both in the accessibility to medical specialties, and in the quantity of generated consultations during the period of the study.

Graphic 2.

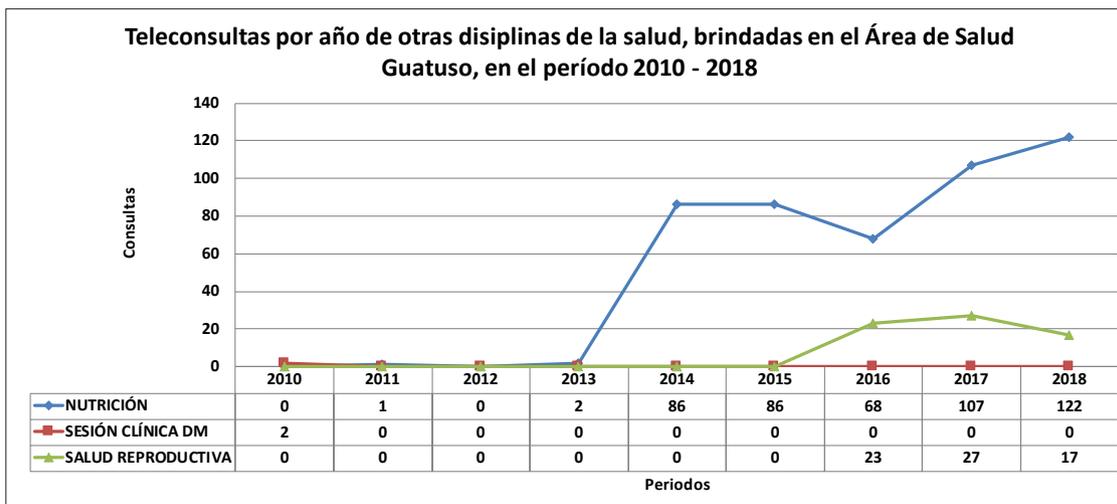


Source: Register and Statistics Guatuso Health Area

As for surgical specialties for the Guatuso Health Area it is determined that there is availability of a smaller quantity of specialties, corresponding to surgery, otolaryngology and urology, noting the big consistency through periods for the first ones, generating a total of teleconsultations during the 9 years of 376 consultations for otolaryngology and with an average of 42 teleconsultations by period, same situation with surgery, accumulating a total of 264 consultations and an average of 29 teleconsultations by year.

Regarding the urology specialty there was a total loss of implementation from the period of 2012 without continuity of the process, resulted by a lack of sensibility by the specialist or difficulty to carry out procedures or laboratory in the support services for these.

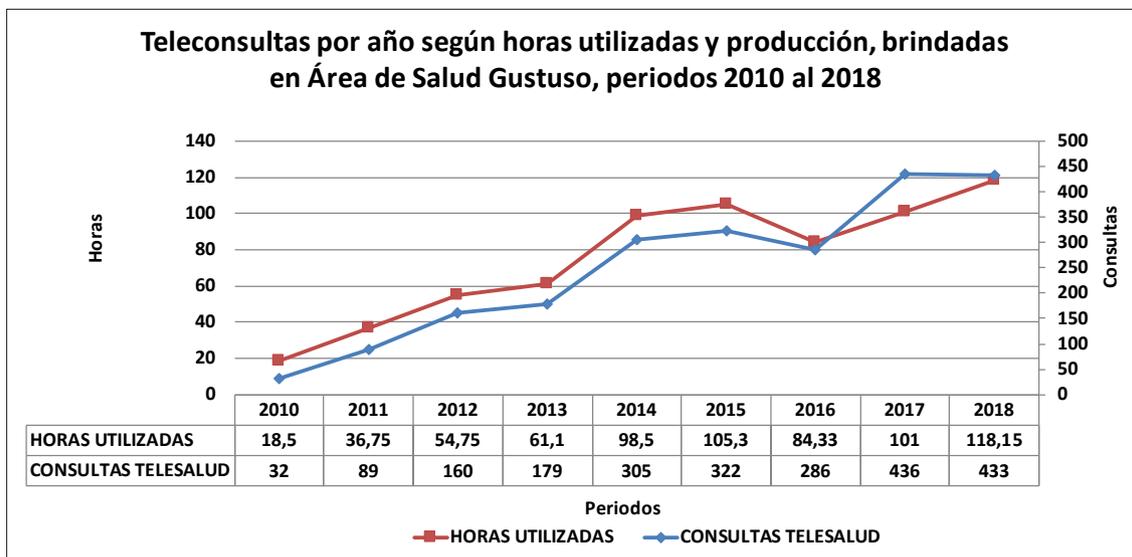
Graphic 3.



Source: Register and Statistics Guatuso Health Area

For other disciplines of the non-medical health, we found the inclusion of the Health Area in services of nutrition, sessions of clinic for diabetics and reproductive health, of which its biggest implementation corresponds to the nutrition service, from the year 2014, quantifying a total of 472 teleconsultations with the professional for this service, and with an annual average of 67 consultations among the implemented years and of which have been carried out with the Los Chiles Hospital being a semi specialized center of the region constituted as Rural Hospital, in which there are specialties and basic services such as pediatrics, gynecology, internal medicine, general surgery, anesthesiology, nutrition, social work, psychology with only a human resource by service associated to general doctors, infirmary, laboratory, pharmacy, radiology technicians, janitors, administrators, among others non focused directly in the health of the teleconsulting user.

Graphic 4.

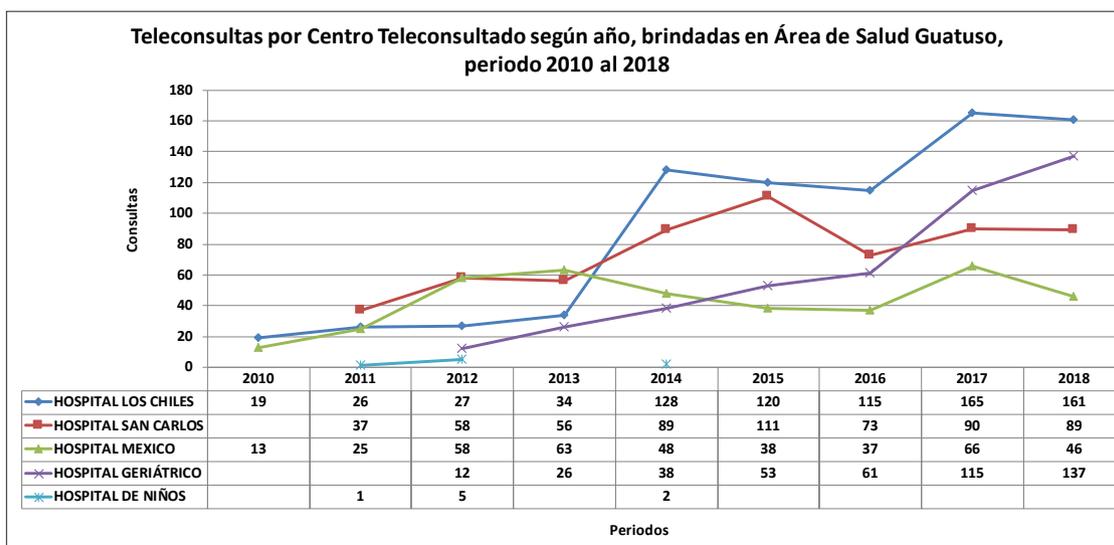


Source: Register and Statistics Guatuso Health Area

To the comparative analysis between the total of consultations provided according to periods and used hours for this first level of attention, it can be achieved to visualize a similar tendency and with predisposition to the annual raise of a period to another, initializing in 2010 with a total of 32 consultations associated to 18.5 used hours, from which through the periods raise until reaching the year 2018 a total of teleconsultations of 433 in 118.15 used hours.

It is also worthy to note tha, on average, the quantity of minutes used by teleconsultation between 2016 and 2018 is basically the same that the ones used in face-to-face consultations.

Graphic 5.

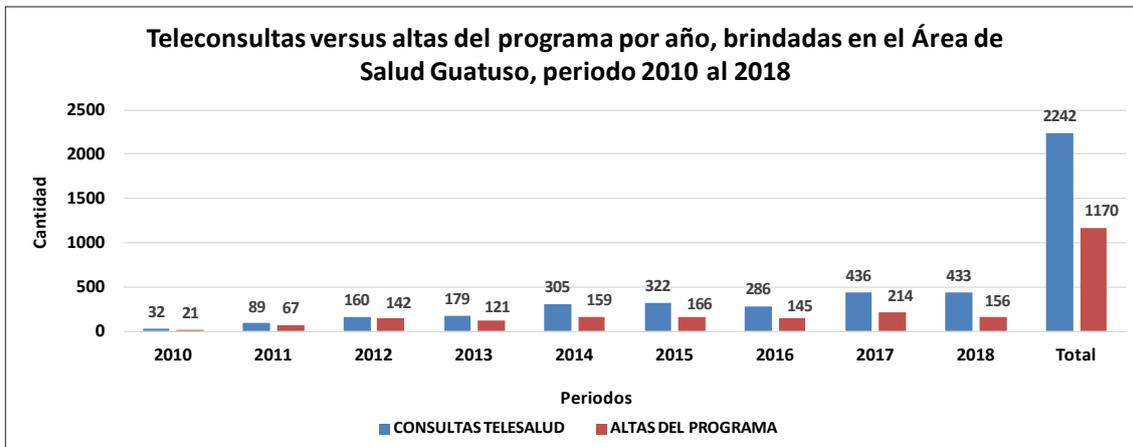


Source: Register and Statistics Guatuso Health Area

Regarding the teleconsulted Hospitals, it can be identified 5 specialized centers from which two of them, San Carlos Hospital and Los Chiles Hospital, belong to our Region. The Mexico Hospital corresponds to the III level of attention of reference of our network; as for the remaining Hospital Nacional de Niños and Geriatrics Hospital, correspond to two national specialized centers, focused to specified populations.

In the observed data for the medical facilities, four of them correspond to those of bigger constancy in consultations provided and correspondent to the Hospital Los Chiles 795 consultations, Hospital San Carlos 603 consultations, Geriatrics Hospital with 442 consultations and Mexico Hospital with 394 consultations.

Graphic 6.

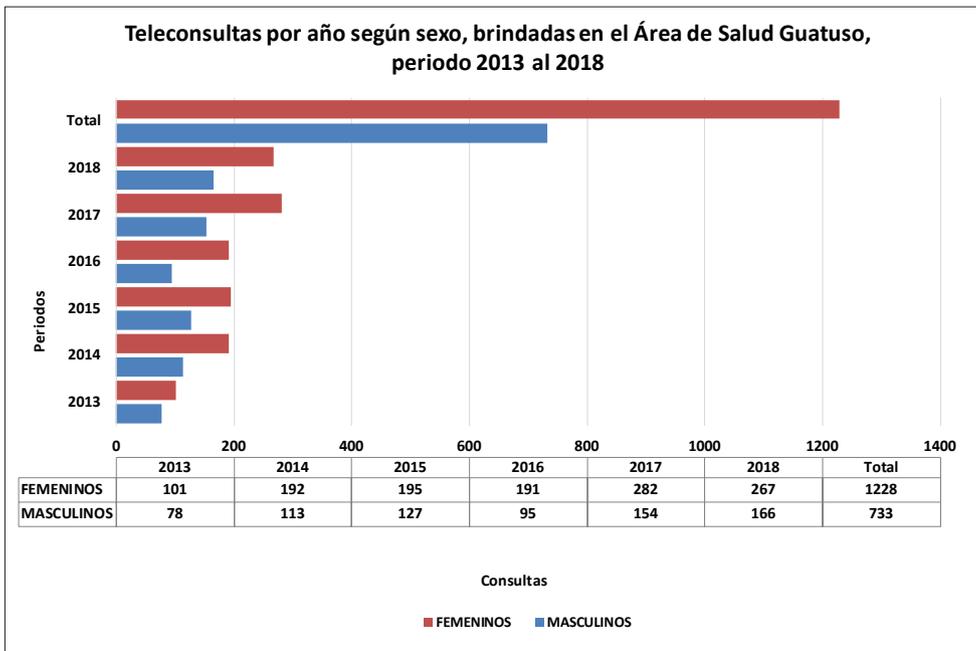


Source: Register and Statistics Guatuso Health Area

Regarding teleconsultations that were carried out versus programmed discharges by year of study, it can be identified for the Guatuso Health Area a global percentage of 52.19% of effectiveness and where the rest stays inside the virtual program or in specific cases with the need of reference and specialized physical attention.

As for the individual analysis according to period, it can be determined that the bigger percentages of discharge correspond to the years of 2011 and 2012 with 75.28% and 88.75%, respectively, as well as the smaller periods regarding the discharges are 2017 and 2018 with 49.08% and 36.03%, respectively.

Graphic 7



Source: Register and Statistics Guatuso Health Area

Regarding the distribution according to sex by period of study, it is determined that the female sex was the one that accesses the teleconsultations the most, in a general relation of 1:1.68, corresponding to 1 masculine by 1.68 feminine.

## Discussion and conclusions

- Marching very closely to the strategy at a country level by which Costa Rica has as goal to improve the scope of the health services in the health services in the remote areas through telemedicine, it can be noticed how, since the year 2010, the Guatuso health area presents generally a linear growth of teleconsultations.
- Generally, 52% of the population that benefited with the telemedicine program has been discharged and its health problem have been resolved, which means that this percentage has been cared for without the need to dislocate itself, providing the patient an attention with quality without incurring in costs related to transportation and in a quicker manner.
- It is important to recall that from a total of 2242 teleconsultations to the 5 different hospitals, 844 teleconsultations correspond to hospitals specialized in the metropolitan area, that would mean that the patient would need to dislocate themselves from the Guatuso zone to the GAM and would incur in more elevated travel expenses, not to mention the complications to the more vulnerable populations such as bigger adults. As a matter of fact, the tendency to an increase in teleconsultation for the Geriatric Hospital in 2016 henceforth could be a clear indicator of benefit for the patient, noting the exponential growth between 2016 and 2017.
- Observe that nowadays and since 2017 Geriatrics is the most consulted specialty which is consistent with the previous result, which helps us to infer that this population is one of the most benefited of the telemedicine program.
- As exposed in the results, it is demonstrated that in the beginning of the program the time invested by each teleconsultation was considerably bigger than the time for a face-to-face consultation, which could be attributed to learning curve due to the new technology and the new procedures. As the program advances through time it is clear that these times get smaller until matching the average times for a face-to-face consultation. It is possible then to ensure that the process has become more efficient and the learning curve has stabilized.
- From the year 2013 it is presented a diversification of the telemedicine service to other health areas as is the nutrition, which presents a linear growth since then, resolving one more need in the health field.
- It is important to mention that the development and the implementation of telemedicine programs in faraway

regions of Costa Rica generates a benefit to the population, to the health professionals and to the institution. The interconnection with the 5 teleconsulted hospitals allows the health professionals of the Guatuso Area to carry out an analysis of clinical cases, aiding their continued training and improving the access of the population to a specialized healthcare. During these 9 years, the telehealth program has been consolidated more and more, generating a considerable number of teleconsultations for the benefit of the population of Guatuso.

- Telemedicine represents a very important tool for the resolution of cases in Latin-America nowadays. Its use in Costa Rica continues to grow as made clear this review carried out in the Guatuso zone. This method allows to provide a timely care for the patient, in addition to the exchange of information among the professionals of different centers. Going forward, the use of telemedicine in different health services must be normalized, and its infrastructure must be strengthened; this in order to optimize the use of resources in Costa Rica's social security.

## Acknowledgment

The investigation team wishes to thank the opportunity provided to participate in this Latin-American experience, that allowed us to widen the concepts associated to telemedicine and its different synonyms, whose projection for the future in our institutions is promising for the care of our users with the appearance of new applications and the latest accessory equipment.

At the same time, we want to highlight the statistics work carried out by Lic. Deibi Alfaro Rivera as part of the Department of Registers and Statistics in Health in the Guatuso Health Area that allowed us to have a trusty basis for the development of this analysis.

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