Chapter

An Analysis of Telemedicine Experiences and Services in Chile

Antonio Rienzo Renato

Abstract

Applications based on telemedicine have been progressively increasing, and Chile is not the exception. After a set of isolated projects and government programs, a National Telehealth Program has been defined in the country. The content of this chapter intends to make a contribution to know the current situation of the country in this area. The author explains the main reasons why there is inequity, and geographic and demographic conditions that drive the need for this type of telemedical applications to grant and improve the health care of the population are explained. The chapter includes a brief theoretical conceptual summary with the characteristics, advantages, and disadvantages that telemedicine incorporates. Also, he presents the results of some of his investigations. Finally, the foundations and lines of action of the new Telehealth program that has been launched in the country are presented.

Keywords: telemedicine, Telehealth, e-health, telemedicine services, home care, information and communication technologies (ICTs)

1. Introduction

One of the major problems defined by the World Health Organization (WHO) in patient satisfaction is precisely not being satisfied with the system. Long waiting times to find a solution to their pathologies and long waiting lists to be able to perform exams or surgery are the problems that bare the lack of implementation and lack of specialists within the public service. In addition, if we add the evolution of the population toward an aging population as projected by the United Nations, where according to data from the 2017 revision of the report “Perspectives of World Population,” it is expected that the number of people over 60 or more years (13% of the world population) will double by 2050 and triple by 2100; it will go from 962 million in 2017 to 2100 million in 2050 and 3100 million in 2100, reaching 22% [1, 2]. This population is more prone to chronic and degenerative diseases, which entail a wide demand for beds and days of hospitalization in the public service, which obviously makes the situation of overpopulation of patients in hospitals worse; attacking these diseases in a preventative manner, with monitoring systems, and country level strategies of care and prevention would be ideal to reduce the cases of chronic patients, assuming the aging of the population, but at the same time taking it with full responsibility in the field of public health.

On the other hand, in the context of Chile, we have a country with a unique topography, between the Andes mountain range on one side and the Pacific Ocean
on the other, with a width of only 177 km from east to west and 5152 km from north to south, where the population is poorly distributed with an average country density of 20.4 Hab/km$^2$, but with some cities having more than 400 Hab/km$^2$, we have a collapsed system [3]. Therefore, doctors and specialists are concentrated in cities with higher densities, thus, causing a great social and economic cost for patients from more isolated sectors who must go to the major centers of reference to receive medical care. This is why the country is in an unbeatable position to allocate resources and be a leader in applications that help to decongest hospitals, decrease waiting lists, and grant access to the inhabitants of more isolated areas in our country. Telemedicine is considered as a solution to this type of problem. This is how the country’s Ministry of Health (MINSAL) has decided to support telemedicine applications developed in different areas over the last few years, improving care in different pathologies [4]. Applications such as teleophthalmology, teledermatology and telecardiology are part of the portfolio of services being delivered in the public sector today to improve access and care for patients. But what is the true scope of these applications? This research can be a source of information and input for any institutions or health facilities that want to carry out intervention programs in its population with telemedicine programs.

The author of this Chapter, is an electronic engineer (Pontificia Universidad Católica de Valparaíso), with a Master’s degree in Computer Engineering (Universidad Técnica Federico Santa María), and another Master’s degree in Management of Health Organizations (Universidad de Valparaíso), he estimates that as an academic and researcher at the University of Valparaíso, it was necessary to generate knowledge and experiences, to know and spread the real state of telemedicine in the country. In this chapter, he appeals to his work experience acquired in the area of telemedicine, as Chief of Information Technology of a Public Health Service, and summarizes a sequence of background information resulting from his own work, projects, and research.

2. Theoretical framework

First of all, we mention that Telehealth aims to improve access and opportunity to health services, and it must be developed under the model of integrated health services networks (IHSN), defined by the Pan American Health Organization (PAHO) as “a network of organizations that provides, or arranges the provision of fair and integral health services to a defined population, and is willing to be accountable for its clinical and economic results” [5].

The Telehealth presents us with an innovative strategy that allows us to optimize specialized human resources, complementing actions and solutions that allow the benefited population to experience a substantial improvement in access to health care. This being a strategy includes the access gaps to the system and the opportunity for attention to the patients.

2.1 Telemedicine

Among the different definitions used for the term telemedicine, we can agree for its most frequent use, that is, a way of providing health services to patients who are limited to it by geography, work, or health issues. In these cases, telemedicine can improve the accessibility and efficiency of these services. In the same sense, the WHO refers to telemedicine as “the provision of health care services in cases where distance is a critical factor, carried out by health professionals who use information and communication technologies (ICTs) for the exchange of valid information to
make diagnoses, prevention and treatment of diseases, ongoing training of health care professionals, as well as for research and evaluation activities, in order to improve the health of people and their communities” [4, 6].

There is a great variety of medical specialties and technological applications in telemedicine although there is no standardized categorization for the latter; they can be classified according to their applications, specialties, method of data transmission, and according to the geographical area. Regarding definitions and terminologies, it is considered necessary to standardize the following terms, from the extensive portfolio of medical specialties, which have gradually been converted into telemedicine applications. The following are some of the most representative and highly used specialties in our country [4, 7].

A. Telecardiology: Consists of the prevention, diagnosis, and treatment of cardiovascular diseases, especially acute myocardial infarction (AMI) at a distance. It allows the interaction of primary health care personnel (PHC) in real or deferred time and on an ambulatory basis with cardiologists to avoid geographical movement and to solve emergencies. Initially, it consisted in the interaction between the health staff and the specialist doctor (through electrocardiograms); at present, the equipment can record and send electrocardiograms, echocardiograms, heart sounds, sounds, and images.

B. Teledermatology: Consists in the exchange of medical information (through visual communication, or transmission of photographs or images). It allows the PHC staff to interact in real or deferred time and on an ambulatory basis with dermatologists to avoid geographical movement and grant diagnosis at a distance. Since diagnostics are mainly in images (storage/sending/receiving), it makes the consultation and subsequent response an effective way to grant consultation of diagnoses, treatments, and health care management.

C. Telereophthalmology: Consists of the referral of the patient, where health personnel interact with the patient and a specialist doctor, about a problem related to eye injuries. It allows deeper exploration and detection of other lesions or alterations, such as the screening of diabetic retinopathy.

D. Telepsychiatry: Consist of the referral between the patient and the specialist doctor, at the different levels of pathologies, such as depression, anxiety, stress, schizophrenia, use of substances, etc.; through videoconferencing interventions in adults, children and adolescents, and mental health programs.

E. Telenephrology: Consists of the referral between a family doctor in the deferent center, and a nephrologist (online or deferred, with or without the patient), about the history of a patient with chronic kidney disease, and his/her possible treatment and evolution.

F. Teleneurology: Consists of the referral and provision of neurological assistance between the patient and the specialist doctor; when they are not present in the same place and/or temporary moment (through videoconference, images or data of the clinical history).

G. Other Teleconsultations: Consists of the consultation or referral, between the patient, the health personnel, and a specialist doctor (in a remote location), in real time or deferred, about diagnoses, treatments, medical images, or requirements, in a certain pathology (not included in the others named before).

H. Teleradiology: Transmission of radiological images from one place to another for the purpose of diagnosis, interpretation or consultation. To be able to make teleradiology, a digital X-ray equipment, or a conventional X-ray machine plus a digitizer are usually required. In this case, a remote service is already provided. The interaction happens here between the X-ray technician and the doctor.

Also, within telemedicine, two basic modes of operation can be distinguished: (a) in real time or synchronous mode, (b) in deferred time or asynchronous mode, or, as it is also known, the storage-sending mode [4, 8, 9].
For the synchronous modality, it is required to schedule an appointment and simultaneous availability of the agents that will interact in the session; it is based on the interaction in real time and live, which allows live communication from the treating doctor or another professional, patient, and specialist, the latter being who will deliver diagnostic and/or therapeutic guidelines to the treating doctor. We have to distinguish two types of synchronous modality: programmed (making an appointment) and urgency (when the patient needs to talk to the doctor at that same moment).

The asynchronous modality allows the storage and transfer of data and fixed images (store and forward) in “deferred,” which are sent to a specialist professional along with the patient’s medical history, so the doctor issues a diagnostic and therapeutic advice. In this modality, there is no direct interaction between the specialist and the patient, and the asynchronous mode is used in those cases in which the diagnosis or consultation of the information sent does not imply an emergency situation, and its query can be deferred in minutes and hours, using, for example, the mail as a means of transmitting the information. This modality is the one that has greater volume of activity at the present time.

Telemedicine is characterized because distance exists between the sender and the receiver (doctor-patient), so it is necessary to use some means of communication to transmit the necessary information, and that at both ends, there are some means or equipment that codifies the shared information. It is also essential to have the necessary infrastructure to establish a telecommunication (teleconsultation). For this, there are indispensable elements that are used for the use of telemedicine. Among the minimum components that a telemedicine network must contain to ensure adequate medical support from a distance, we can mention [10]:

- patients;
- health personnel in primary care (PHC) or first contact (general doctor, nurse);
- the consulting center (fixed or mobile);
- medical specialists or subspecialists;
- reference centers or telediagnosis (second or third hospital level);
- an adequate telecommunication network;
- the necessary equipment (video conferencing equipment, medical peripherals); and
- company and/or technical support staff.

2.2 Latin American experiences

According to the World Health Organization (WHO) [10], telemedicine is defined as “the provision of health care services, in which distance is a critical factor, by professionals who appeal to the technologies of the information and communication in order to exchange data to make diagnoses, recommend treatments, and prevent diseases and injuries, as well as for ongoing training of health care professionals and in research and evaluation activities, in order to improve health of the people and communities in which they live.”
One of the first activities carried out from the academic point of view was to investigate and learn about telemedicine experiences in the countries of Latin America. To this end, certain sources of information were used, and it could be established that although some of these publications had been published in Santiago, Chile, none of them mentioned a case of Chilean experience [11].

According to the specialized literature on the subject (only in Latin America), there are countries such as Costa Rica, Brazil, El Salvador, Ecuador, Mexico, Colombia, and Panama, where the Government has defined and established a “telemedicine policy,” with precise guidelines regarding objectives, prioritization of projects, processes, and concrete actions with allocation of resources [6, 11–13].

2.3 Advantages and disadvantages

As mentioned above, ICTs offer great potential to solve the challenges faced by developed and developing countries in providing accessible, timely, and quality medical services. Telemedicine uses ICTs to overcome geographical barriers and increase access to health care services. This benefits rural areas and marginalized communities that do not have direct access to specific health care.

Telemedicine is one of the most prominent, known and used branches of Telehealth, according to the American Telemedicine Association (ATA). Telemedicine is the exchange of medical information between two actors that are not located in the same space, which can be doctor/patient, or doctor/doctor; through electronic communications, through some means of electronic communication, in order to improve the health status of a patient. It includes “a growing variety of applications and services that use videoconferencing, email, smartphones, wireless communications and other forms of telecommunications technology” [4].

The specialized literature on the subject mentions that there are several advantages and benefits that different telemedicine applications can bring [9, 10].

2.3.1 Advantages

One of the most relevant advantages of Telemedicine is the reduction of inequalities in the population to have access to health services, regardless of geographical location. It also facilitates equity in access to such services by providing high quality universal medical care.

It also provides patients with specialized medical care, in places where they do not have it (or it is very time consuming), reducing the need for travel by patients and/or health professionals.

It allows the reduction of times and waiting lists; by means of a shorter time in the realization of the diagnosis and consequently, less time in the treatment, avoiding delays in the serious cases that could cause problems for the patient.

It manages to increase the efficiency of the system by optimizing health care resources, improving demand management, reducing hospital stays, and reducing repetitions of examinations as well as medical acts.

It also allows the decentralization of demand in medical care, avoiding the saturation of emergency services, as well as in second and third level hospital units.

You can also specify benefits by groups of beneficiaries:

1. For patients: Diagnoses and faster and more timely treatments; reduction in the number of further and multiple examinations; comprehensive and continuous care from the first moment; the discomfort of displacements for patients and relatives is avoided, to consult a specialist doctor, reducing possible expenses. It also facilitates the intradomiciliary management of the disabled
patient, prostrate or unable to move; and families can stay longer and closer to the patient, and have more direct contact with health personnel.

2. For health personnel in primary care (PHC), or first contact: New possibilities to consult with specialists; the possibility of avoiding inconvenient displacements; more elements of judgment when making decisions, being able to verify diagnoses and request a second opinion with the specialists; improves the quality and timeliness of the background to be able to diagnose. It also improves the flow of information transmission, avoiding the loss (or duplication) of reports and exams; grants the possibility for training and training of health professionals, through continuing medical education.

3. For hospitals: Reduction of the risk of loss of exams and images; faster and more accurate diagnoses and treatments; better and faster communication between different services; eliminate duplicate information; more effective care equipment and services; greater economy in the expenses derived from the transportation of patients; and an optimization of internal administrative processes.

4. Advantages for the health system: Better use and use of resources (physical, human, and financial); better management of public health and the health care network; additional resources for teaching students; more flexible and timely scientific and statistical analyzes; an increase in the accessibility of information at all levels of care; and allow the establishment of medical support networks at the country level.

2.3.2 Potential drawbacks or challenges of telemedicine

Also, the introduction of telemedicine sometimes has its disadvantages, or potential drawbacks for its correct implementation. Among which:

• Less accuracy for the diagnosis of certain images transmitted with telemedicine in relation to the original images, if the ICTs are appropriate for us. There is a risk of loss of data and images (resolution) due to the compression of said data to increase the transmission speed.

• Aspects linked to security and confidentiality in the doctor-patient relationship through appropriate interfaces, with possible legal and ethical implications.

• Increase of the demand to the specialists, being able to reach not being able to satisfy the high assistance volume of patients.

• The programs used in telemedicine should be compared with other alternative options, ensuring that in addition to offering very fast services are also viable services.

• Obstacles may arise during the implementation and setting up of this new technology, by health professionals, by the typical reaction to change, fear of losing their jobs, or lack of training.

• The implementation of telemedicine systems depends on an adequate telecommunications infrastructure. And, the technology and infrastructure must be sufficiently developed to support the implementation of large-scale
An Analysis of Telemedicine Experiences and Services in Chile
DOI: http://dx.doi.org/10.5772/intechopen.81756

telemedicine; the aspects of good bandwidth and quality of service (QoS) are important.

• It is very important to have a diagnosis and survey of the real needs of the population so that the health services are not prey to the providers of equipment and services (and that they do not consider the real needs of the users). The programs used in telemedicine must be compared with other alternative options, to make sure that in addition to offering services with speed and quality, they are also viable services.

3. Status of telemedicine in Chile

3.1 Experiences and previous investigations

Health spending represents, in Chile, about 10% of GDP and grows at a rate close to 10%. This level of spending and growth is comparable to that of the OECD countries [8]. It is a known fact that if the efficiency in the use of resources is not increased, the maintenance of the system will be unsustainable, causing serious damage to the quality and life expectancy of the people. In this context, various technologies, services, and strategies have emerged in the world to empower them in order to overcome the current gaps (specialists, waiting lists, etc.) and those that are to come (chronic diseases, increasing life expectancy). Medicine currently has a development of therapeutic options greater in quantity and effectiveness than at any other time in its history. A fundamental concern lies in the ability of the health system to reach the people who require these therapies in an effective and equitable manner. The development of technologies that support clinical systems and health management provide an opportunity to shorten gaps in effective coverage that achieve the development of a fair and efficient health system.

In the case of Chile, there is a consensus on the urgent need to incorporate technologies and improvements in management. Therefore, a specialized strategic program is required to reduce gaps, catalyze and streamline regulatory processes, and the adoption of technologies and services, delivering measurable and demonstrable results in the short term that will position Chile as a leader in the region.

As previously mentioned, while several Latin American countries were advancing in telemedicine policies and plans, Chile did not appear in the specialized literature. Several initiatives and advances in this regard began to be developed. In Chile, telemedicine has been seen as a necessary solution to face the problems of coverage, shortage of specialists and care in remote areas, a problem that is especially relevant given the geography of the country. Thus, from 1993 onward, a series of public and private initiatives have been developed for the realization of telemedicine services. The development of these initiatives can be summarized in the following milestones that also mark the history of this discipline in the country.

The author of the chapter carried out an investigation to quantitatively know the specialty medical consultations based on the use of telemedicine. In Chile, given the information needs required by MINSAL (Ministry of Health), it is required that each establishment with an assigned DEIS code (recognized by the Department of Health Statistics and Information), report its production of attentions and population in control individually; to then consolidate it in the Health Service to which it belongs, and finally send it to MINSAL [7].

All the above information is consolidated in the REM (monthly statistical summary), which MINSAL receives in a timely manner from all the Health
Establishments in the country. Among them, there is REM-A07, which is used by all establishments with Medical Care of Specialties, such as: Therapeutic Diagnostic Center (CDT), Hospital Specialty Center (CAE), Health Reference Center (CRS), and Community Center for Mental Health (COSAM); and also all the PHC establishments (CESFAM) that have a specialist doctor. In particular, Section F of this summary corresponds to the provision of specialty medical consultation granted to outpatients from various primary health care centers or hospitals of low complexity, which require remote assistance from a Specialist Physician through the use of ICTs, registering the production of specialty consultations by telemedicine.

For the study, official data were requested from MINSAL, through requests for Transparency Law (public access); and the period between January 2014 and December 2016 (3 years) was included, considering that all specialties were already mature enough and in normal use. However, not all specialties have the same coverage in all regions of the country; and all the information that is delivered is available for confirmation. To date, seven categories are being registered and consolidated in the country: telecardiology, teledermatology, telepsychiatry, teleophthalmology, telenephrology, teleneurology, and other teleconsultations.

The different data were stored in a matrix repository. The global statistics of this original work are shown in the graph of Figure 1. With a universe of 139,763, registered care at the country level (for 36 months), correspond to 24,187 throughout 2014, to 44,906 in 2015, and 70,670 in 2016; representing a notable increase (292%) in said period. Of these, 58,281 correspond to men, and 81,482 to women. Of the total of them: 12,031 attentions for beneficiaries of less than 15 years, 62,348 of more 15 and less than 60 years; and to 65,384 for patients over 60 years of age. In Table 1, the medical consultations by telespecialty and age range are shown, and its graph is shown in Figure 2.

Figure 3 shows teleconsultation total by specialty (during the 36 months of study). In Figure 4, the evolution of the specialties during the 3-year investigation is shown.

According to the study, of the seven specialties, the largest medical consultations correspond to teledermatology (26.8%), teleophthalmology (24.7%), and telecardiology (22.1%) and those with the least registration are the telepsychiatry specialties (1.5%), teleneurology (1.8%), and telenephrology (2.6%).

![Teleconsultations by Sex and Age](image)

**Figure 1.**
*Teleconsultations by sex and age (2014–2016).*
3.2 Projects and programs

As mentioned, currently, Chile does not have a directory that allows the possibility of publicizing and sharing the different experiences in telemedicine that have been carried out or are being carried out, either in the form of pilot plans, projects or stable programs. Based on the report “National Telehealth Program,” and as another contribution by the author, the information was organized into categories according to the type of telemedical service that is delivered, and the direction of the flow of information was also defined, defining the derivative centers (who requests) and the centers of reference (who answers), indicating the telespecialty that is offered.

The records were grouped into three cases:

- Projects, which are cases in which different health facilities, by initiative and own funds, establish an agreement with a specialty reference center, and perform types of care according to the specialty they require, see Table 2.
The National Strategic Programs, which are initiatives and actions initiated by the MINSAL and which establishes and finances the start-up of care in almost all health facilities in the country, is shown in **Table 3**.

The Telemedicine Platforms and Committees are the telemedicine services provided by several specialized companies in this type of service, or Centers specialized in Telemedicine, see **Table 4**.

### 3.3 Legislative framework

In Chile, there is no specific legislation on Telehealth and/or Telemedicine, however, reference is made to International documents that propose the adoption and execution, by the Member States, of telehealth policies or e-health, as a strategy.
to improve health of those States. In this regard, the World Health Organization, in 2005 agreed Resolution WHA.58.28, adopted at the 58th World Health Assembly, which indicates that there was awareness that advances in information and

| Year Start | Derivative Center | Reference Center | Classification | Project Specialty |
|------------|------------------|------------------|----------------|-------------------|
| 1993       | Universidad Católica | Dr. Sotero del Río Hospital | Telediagnosis | Comparison of traditional diagnosis vs telediagnosis |
| 1995       | Clínica Alemana Temuco | Clínica Alemana Santiago | Telediagnosis | Teleconsultation |
| 1996       | Corresponde | Clinica las Condes | Telediagnosis | Telemonitoring |
| 2000       | UCH Clinical Hospital | J. John Hopkins (EE. UU) | Telediagnosis | Teleconsultation |
| 2001       | Carlos van Buren Hospital | Universidad de Valparaiso | Telecapacitation |  |
| 2003       | Antártica | UCH Clinical Hospital | Telediagnosis | Teleradiology |
| 2009       | San Carlos Hospital | Lisbonses Hospital | Telediagnosis | Teleconsultation |
| 2012       | Quirón Hospital | Castro Hospital | Telediagnosis | Teleconsultation |
| 2015       | Puerto Natales Hospital | Magallanes Hospital | Telediagnosis | Teleconsultation |
| 2016       | Foroni Hospital | Hospital del Tórax | Telediagnosis | Teleconsultation |
| 2017       | Los Ángeles PHC Centers | Concepción Teletón | Telediagnosis | Teleconsultation |
| 2017       | Molina Hospital | Hospital del Tórax | Telediagnosis | Teleconsultation |
| 2017       | CEMT + UCH Clinical Hospital | El Maule Health Service | Telediagnosis | Teleconsultation |
| 2018       | San Martin Hospital | Barros Luco Hospital | Telediagnosis | Teleconsultation |
| 2018       | San Martin Hospital | Gualberto Fricke Hospital | Telediagnosis | Teleconsultation |
| 2018       | Magallanes Hospital | UCH Clinical Hospital | Telediagnosis | Teleconsultation |
| 2018       | CESFAM Semilleros | CESFAM Paulina Avendano | Telediagnosis | Teleconsultation |
| 2018       | CESFAM San Vicente, Talcahuano | CESFAM San Vicente, Talcahuano | Telediagnosis | Teleconsultation |
| 2018       | CESFAM Los Cerros, Talcahuano | CESFAM Los Cerros, Talcahuano | Telediagnosis | Teleconsultation |
| 2018       | CESFAM Huapulco | CESFAM Huapulco | Telediagnosis | Teleconsultation |
| 2018       | CESFAM Alberto Reyes, Comuna de Tomé | CESFAM Alberto Reyes, Comuna de Tomé | Telediagnosis | Teleconsultation |

Table 2. Main telemedicine projects.
communication technologies have generated expectations regarding health; and recalling resolution WHA51.9, he emphasized that e-health consists of the support that the cost-effective and safe use of information and communication technologies offers to health and related fields, including health services, health care, health surveillance and documentation, as well as health education, knowledge, and research [4], and urged the Member States to develop and promote a range of activities, including the establishment of national networks and centers of excellence working on e-health, and in particular on exemplary practices, policy coordination, and technical support for the delivery of health care, improvement of services,

Table 3.
Main National Telemedicine Programs.
information to the citizen, development of means of action and surveillance. In relation to the legal norms that allow and sustain the development of the Telehealth Program, we can mention as the first foundation the Political Constitution of Chile, in its Article 19, numeral 9, this ensures all the people the right to health protection and establishes as a duty of the State to protect free and equal access to actions for the promotion, protection and recovery of health and rehabilitation of the individual.

On the other hand [4], Article 3 of Law No. 18.575, Constitutional Organic General Bases of the State Administration states that: “The State Administration is at the service of the human person; Its purpose is to promote the common good by

Table 4. 
Main platforms based on telemedicine.
attending to public needs in a continuous and permanent manner and promoting
the development of the country through the exercise of the powers conferred by
the Constitution and the Law, and the approval, execution and control of Policies,
Plans, Programs and Actions of national, regional and communal scope.”

The aforementioned standards constitute an obligation for the State and that
is why actions must be taken to ensure access to health care, whether these actions
are carried out in a conventional manner or whether new strategies should be
implemented.

In addition, Article 1, DFL N°1, of 2005, of MINSAL, which establishes a con-
solidated, coordinated, and systematized text of Decree Law No. 2763 of 1979 and
of Law Nos. 18,933 and 18,469 reinforces the provisions of the Political Constitution
and establishes the responsibility of the Ministry of Health to guarantee such right,
as well as to coordinate, control, and when appropriate, execute such actions.
According to the above, in our country telehealth strategies will be implemented
within the framework of current regulations and associated with defined clinical-
care processes, complying with the standards of face-to-face care [4].

In relation to the applicability of the telemedicine modality in the health benefits
associated with the Auge-GES and non-GES Plans (pathologies with and without
guarantees), and regarding the legal medical liability associated with this benefit, the
Legal Division of MINSAL has informed, through Memorandums A15 N°04995, of
December 31, 2013 and Memorandum A 15 N°0223, of September 3, 2015, as follows:
“Under the modality of telemedicine it is possible to incorporate that set of medical
assistance procedures that are materially executed remotely, using different means of
communication and image technologies, in order to collaborate in the care of health
and ranging from clinical background and examinations to technical assistance in
medical work of any kind, such as invasive and non-invasive procedures, which are
developed remotely and under specific professional supervision.” Also, “Telemedicine
is part of collaborative professional procedures that contribute to the health care of
people and that is linked to other procedures and professional and technical actions
performed by professionals, technicians, and administrative staff in health. In this case,
the work of assistance developed by telemedicine by an ad-hoc professional, as the case
may be, is delivered to a health team responsible for the face-to-face care of a person,
for the formulation of due care that includes diagnosis and treatment of the case.”

In addition, it is contemplated that [4, 14]:

1. Law No. 20,584, which regulates the rights and duties of people in relation to
actions related to their health care, establishes with respect to informed con-
sent, in Article 14, that this is required for all health care and it will generally
be done verbally. Notwithstanding the foregoing, the patient's consent must be
recorded in writing in the case of “surgical interventions, invasive diagnostic,
and therapeutic procedures and, in general, for the application of procedures
that involve a relevant and known risk to the health of the affected person.”

2. Telemedicine care in Specialty Consultation whether Ambulatory, Hospitalization
or Urgency, is not an invasive procedure or that involves significant risk to health.
Nor are the reports of procedures or examinations carried out by telemedicine. In
this context, it is not necessary to have a signed record of such consent, it being
understood that, in the act of medical care, the professional explains to the patient
the process of care to be developed through telemedicine and the continuity
of care associated with it. In addition to the above, it must be considered that
the benefits to be developed by telemedicine must be defined in the Portfolio
of Establishment Services and Derivation Map, which must be informed to the
Community. The Information and Communication Technologies (ICTs) to be
It also details several important ethical aspects that should be considered for telemedicine care [4].

4. National program

4.1 Objectives

As mentioned previously, while several Latin American countries developed policies and programs in telemedicine, others did not. The CORFO (Production Development Corporation) created, from April 2015, a Strategic Program “Health + Development,” whose main objective was to strengthen the environment for the development of the services, technologies, and health management industry; and ways to effectively contribute to improve the national health system and the quality of life of patients [8]. The program aims to generate sectors capable of producing new goods and services, develop industries, and generate poles of innovation. Then the National Telemedicine Day was held in the city of Valdivia (July 2015) [15]. And in order to continue advancing in the area, it was created in conjunction with the National University Network (REUNA), a working group composed of representatives of different universities, CORFO, Ministry of Health, FONASA, CEPAL, REUNA, and RUTE (University Network of Telemedicine, Brazil), where the advances in the area of telemedicine were discussed and the main challenges that needed to be addressed for its growth.

There was a collective consensus on the need to have a telemedicine policy, which finally progressed toward a National Telemedicine Program, which provides a conceptual framework and technical, strategic, administrative, organizational, and financial guidelines for the development and optimal functioning of the strategies of telemedicine that are already installed in the Health Networks of Chile.

As part of the Strategic Health and Development Program, the Ministry of Economy, Development, and Tourism requested the RAND Health Corporation to create a roadmap to guide the development of information technology (ICT) in health in the public health system in Chile. This project had two phases. For the first phase of this project, the current status of the adoption and implementation of ICT in health in Chile is described. For the second phase, a roadmap was designed that focuses on key
objectives and activities designed to foster growth in the adoption and successful implementation of health ICTs in the public sector in Chile, including telemedicine [16, 17].

If we focus on the competitive advantages, in terms of clinical and hospital services (public and private), Chile is next to Brazil, a leader in the region. In terms of connectivity, another crucial element to develop this type of industry, the country ranks 35 out of 144 according to the ranking of the World Economic Forum (WEF) [8]. Just to compare, Colombia ranks 63rd in the ranking, Brazil ranks 69th and Mexico 79th in the same ranking [1, 2]. Finally, Chile has been a pioneer in the implementation of fiber optic connections for the transfer of complex and high-speed information, highlighting in particular the effort made by the National University Network (REUNA) and the austral cable project currently under study. On the demand side, the main driver for the development of this program, we find a health sector where public and private spending increases steadily as a consequence of factors such as the aging of the population, the increase of chronic diseases and the growing lack of specialists. Only by way of example, spending on health in the public sector has increased only 11, 8% in the last year, reaching almost 8% of GDP as reported by the Government’s Budget Office.

Based on what was stated in point 3, for the current development of Telehealth it was required to address in a Program [4], the following areas:

- Decrease of access barriers, improving the opportunity and continuity in the attention of the user population, for the satisfaction of their health needs.

- It will allow to diminish the impact of the deficit of specialists in areas that present gaps in the country.

- It will allow the optimization of existing resources in the Network, positively impacting the pocket expense15 of the population.

- It will favor the technical transfer from the health teams between the different levels of care, facilitating training, and continuing education. Also, the interrelation between professionals for the promotion of good professional practices.

- It will allow to define the technical competences of the human resource, its functions and profile according to the actions to be developed in the different components of the program.

- Having organizational definitions of the program will facilitate its development and implementation in places where it is not yet installed. By defining its organizational aspects will allow the program to develop and maintain in time independent of the political changes that occur in the country.

- It will allow improving communications coverage, connectivity, and its quality, and the equipment required for telemedicine actions.

- It will help to clarify the legal, ethical, and regulatory framework existing in Chile, for the application of telemedicine and will lay the foundations for a future technical standard.

- By defining its organizational aspects will allow the program to develop and maintain in time independent of the political changes that occur in the country.

- It will favor the interrelation between professionals for the promotion of good professional practices.
This Program defines Telehealth in Chile as: a strategy based on the Model of Comprehensive Care of Family and Community Health [4], in the context of Integrated Health Services Networks [4], and that through the use of technology information and communications, facilitates the provision of distance services from the field of promotion, prevention, diagnosis, treatment, rehabilitation, and palliative care, focused on the person in their socio-cultural context and throughout their life course, with the purpose of maintain an optimal state of health and continuity of care for the population, thus improving equity in access, exercise of rights, opportunity, and quality of care through its three components: tele-education, telemedicine, and telecare.

The general objective of the Program is: to generate the technical, technological, administrative, organizational, and financial conditions to develop the three components of Telehealth in the Health Services, and in this way contribute to improving access and equity in people’s integral health, and the fulfillment of the health objectives of the decade 2011–2020. The principles, specific objectives, and associated characteristics are detailed in the Program itself.

4.2 Lines of action

The lines of action of the Telehealth program in Chile are based on three components [4], as shown in Figure 5.

4.2.1 Tele-education

The general objective is to provide a form of continuous learning, applied to educational processes that integrate the various components and actors, through the use of Information and Communication Technologies, favoring the transfer or generation of knowledge without restrictions of space, time, or distance. It is a planned training and learning process, developed with the support of Information and Communication Technologies, aimed at both the internal and external user and the community, within the framework of a flexible process in time, space, and form, facilitating this accessibility to the formative meeting.
4.2.2 Telemedicine

The general objective is to grant attention and care with the use of telemedicine strategies for the delivery of medical and non-medical remote health services with timely access and quality standards to health care that also reinforces networking, establishing permanent links that ensure the continuity of people's attention. The areas of application of telemedicine correspond to the following Processes: Open Care Process: Primary Health Care; Ambulatory Specialties Care; Attention Process in Hospitalization: Hospitalization Care; Emergency Care Process: Attention in PHC and Hospital Emergency Unit; Surgical Process: Major Ambulatory Surgery-Surgery of Greater Complexity; Diagnostic and Therapeutic Support Process: Procedures, Exams, Analysis samples.

4.2.3 Teleassistant (or Telecare)

Its objective is to allow people to connect with the health network, coordinating the available resources and devices. Involves direct and bidirectional actions, between a person outside a health facility and a team and/or an application, which interact through health information and communication technologies (TIC) for the maintenance, control and improvement of individual health. It has three areas of action: Telemonitoring, Teletracking, and Teleorientation.

5. Conclusion

In this chapter, I wanted to enumerate the different experiences related to telemedicine in Chile, the advancement, the main characteristics, and expectations of the National Program of Telemedicine. I summarized the main concepts involved and the advantages, disadvantages, and challenges that this discipline faces. I have included some research done by me as a contribution to the development of the telemedicine in the future. It is a first version which can be supplemented and improved later.

Conflict of interest

The author declares that he does not have any conflict of interest.

Author details

Antonio Rienzo Renato
School of Biomedical Engineering, Universidad de Valparaíso, Chile

*Address all correspondence to: antonio.riendo@uv.cl
An Analysis of Telemedicine Experiences and Services in Chile
DOI: http://dx.doi.org/10.5772/intechopen.81756

References

[1] Naciones Unidas. Envejecimiento. 2018. Available from: http://www.un.org/es/sections/issues-depth/ageing/index.html

[2] OMS. Envejecimiento y Salud; Notas Descriptivas. 5 de Febrero del 2018. Available from: http://www.who.int/es/news-room/fact-sheets/detail/envejecimiento-y-salud

[3] Herrera A. Telemedicina: Una herramienta poco explotada. Revista Obstetricia y Ginecología. Hospital Santiago Oriente. 2006;1(3):233-236. Available from: http://www.revistaobgin.cl/files/pdf/articulosde_revision_233a2360.pdf

[4] MINSAL. Programa Nacional de Telesalud. Subsecretaría de Redes Asistenciales; 2017. Available from: https://biblioteca.digital.gob.cl/handle/123456789/3635

[5] Staff PAHO. Redes Integradas de Servicios de Salud. Washington: Pan American Health Organization; 2010. ISBN: 978-92-75-33116-3

[6] Staff OPS/OMS. Capítulo Telemedicina; In: Conversaciones sobre eSalud. Departamento de Gestión del Conocimiento, Bioética e Investigación; Washington: EE.UU.; 2014. pp. 99. Available from: https://docplayer.es/8020140-Conversaciones-sobre-esalud.html

[7] Rienzo A. Analysis and repository of services telemedicine in Chile (2014-2015). In: 2016 IEEE International Conference on Automatica (ICA-ACCA); Curicó, Chile; October 2016. DOI: 10.1109/ICA-ACCA.2016.7778414. Available from: https://ieeexplore.ieee.org/document/7778414

[8] Staff. Informe de Mesa de Trabajo de Telemedicina. Programa Estratégico “Salud-Desarrollo”; Subsecretaría de Redes Asistenciales; 2016

[9] Rabanales J, Párraga I, et al. Tecnologías de la Información y las Comunicaciones. Telemedicina. Artículo Especial, Revista Clínica Medica Familiar;4(1):42-48

[10] Staff. Telemedicina; Serie Tecnologías en Salud. Volumen 3. 2da Edición. México: Centro Nacional de Excelencia Tecnológica en Salud (CENETEC). 2011. ISBN: 978-607-460-244-9. Available from: http://www.cenetec.salud.gob.mx/descargas/telemedicina/publicaciones/Volumen32daEdicion.pdf

[11] Staff CEPAL. Desarrollo de la Telesalud en América Latina. Santiago de Chile: Comisión Económica para América Latina y el Caribe (CEPAL); 2013

[12] Salazar A, Kopec A. Aplicaciones de Telecomunicaciones en Salud en la Subregión Andina. Segunda ed. Colombia: ORAS-CONHU; 2006. pp. 97-99

[13] Chueke D. Panorama de la Telemedicina en América Latina. España: Publicaciones de la Asociación Iberoamericana de Telemedicina y Telemedicina; 2015

[14] MINSAL. Ordinario 2C N°247 del 29.01.2018 de la Subsecretaría de Redes Asistenciales. Santiago, Chile: Ministerio de Salud; 2018

[15] Staff. I Jornadas Nacional de Telemedicina. Valdivia: Valdivia Health Service; 2015. Available from: http://www.diariofutrono.cl/noticia/salud/2015/06/primera-jornada-nacional-de-telemedicina-se-realizaran-en-valdivia

[16] RAND. Developing a Strategic Program for Chilean Health Information
Telehealth Technology; Research Report. California: RAND Health Corporation; 2016. Available from: https://www.rand.org/pubs/research_reports/RR1358z1.html

[17] RAND. A Roadmap for the Development of Health Information Technology in Chile; Research Report. California: RAND Health Corporation; 2016. Available from https://www.rand.org/pubs/research_reports/RR1358z2.html