Telehealth National Project in the state of Ceará: experiences and reflections on the implementation of the center

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Abstract

This article aims to present the experience of deployment of the Center for Telemedicine in the state of Ceará, one of the first nine centers established within the National Telehealth Program in a state in which there had already been a previous unsuccessful attempt to implement a telemedicine project. In the early implementation of the project currently in operation was essential to develop partnerships at all levels of health management within the state, facing difficulties related to Internet access, conducting an intense awareness of the aims of the project itself, conducting site visits of physical locations for deployment of the poles and training mid-level professionals who would work there. Several adjustments were necessary to achieve the goals set early in the project, aiming to deploy the 100 poles provided at each stage, to establish an ongoing program of weekly lectures on topics relevant to primary care, to provide the possibility of online and offline teleconsultation, to create a portal services that were integrated into the Brazilian Telemedicine Portal, besides keeping uninterrupted activities in telecardiology and teledermatology. It analyzes the main difficulties, especially those of technological and administrative nature, and their solutions. Comments are finally made on the current status achieved and the future prospects of development in the context of the state with regard to improvements in ICT and the convergence with other projects of the Ministry of Health, with emphasis on the Open University of SUS, UNA –SUS, newly created.

Key words: *Telehealth; Telemedicine; Telecardiology; Teledermatology; Education, Distance; Telehealth National Program; Brazil.*

Resumen

El Programa Nacional de Telesalud en Ceará: experiencias y reflexiones acerca de la implantación del núcleo

Este artículo tiene como objetivo presentar la experiencia de implantación del Centro de Telemedicina en el estado de Ceará, uno de los primeros nueve centros implantados en el programa nacional de telesalud en un estado en el que ya había habido un intento anterior, sin éxito, de ejecutar un proyecto de telemedicina. En la aplicación inicial del proyecto actualmente en funcionamiento fue esencial desarrollar asociaciones en todos los niveles de la gestión de la salud en el Estado, enfrentar dificultades relacionadas con el acceso a Internet, llevar a cabo una intensa labor de concienciación sobre los objetivos del proyecto en si, realizar visitas de campo in situ a lugares físicos para la implantación de los polos y la formación de los profesionales de nivel medio que trabajarían en esos locales. Fue necesario hacer varios ajustes para alcanzar los objetivos fijados al principio del proyecto, con el objetivo de implementar los 100 polos previstos en cada etapa, establecer un programa permanente de conferencias semanales sobre temas pertinentes a la atención primaria, proporcionar la posibilidad de teleconsulta en línea y asíncrona, crear un portal de servicios que estuviera integrado al portal Telesalud Brasil, además de mantener actividades ininterrumpidas en telecardiología y teledermatología. Este trabajo analiza las principales dificultades, especialmente las de los avances tecnológicos y administrativos y sus soluciones. Finalmente se comenta el nivel actual logrado y las perspectivas futuras de evolución, en el contexto del estado en lo que se refiere a las mejorías relacionadas con las TICs, y en la convergencia con otros proyectos del Ministerio de la Salud, con énfasis en la Universidad Abierta del SUS, UNA-SUS, creada recientemente.

Palabras clave: *Telesalud; Telemedicina; Telecardiología; Teledermatología; Eduación a Distancia; Programa Nacional de Telessaúde; Brasil.*

Resumo

O Programa Nacional de Telessaúde no Ceará: experiências e reflexões sobre a implantação do núcleo

Este artigo se propõe apresentar a experiência de implantação do Núcleo de Telessaúde do Estado do Ceará, um dos nove primeiros núcleos implantados dentro do Programa Nacional de Telessaúde, em um estado no qual já havia ocorrido uma tentativa anterior, sem êxito, de implantar um projeto de telemedicina. No início da implantação do projeto atualmente em funcionamento foi imprescindível realizar parcerias em diversos níveis de gestão da saúde no próprio estado, enfrentar dificuldades de acesso a internet, realizar um intenso trabalho de conscientização acerca das finalidades do projeto em si, realizar visitação in loco *dos locais físicos para implantação dos pólos e treinamentos de profissionais de nível médio que atuariam nesses locais. Diversas adaptações foram necessárias para cumprir as metas estabelecidas no início do projeto, visando implantar os 100 polos previstos em cada estágio, instituir um programa continuado de palestras semanais com temas relevantes para a Atenção Básica, disponibilizar a possibilidade de teleconsultorias online e offline, criar um portal de serviços que estivesse integrado ao portal Telessaúde Brasil, além de manter atividades ininterruptas em telecardiologia e teledermatologia. São analisadas as principais dificuldades enfrentadas, principalmente as de natureza tecnológica e administrativa, e as soluções empregadas. Comenta-se finalmente o estágio atual alcançado e as perspectivas futuras de evolução, no contexto do estado no que diz respeito às melhorias relacionadas às TIC, e na convergência com outros projetos do Ministério da Saúde, com ênfase para a Universidade Aberta do SUS, UNA-SUS, criada recentemente.*

Palavras-chave: *Telessaúde; Telemedicina; Telecardiologia; Teledermatologia; Educação a Distância; Programa Nacional de Telessaúde; Brasil.*

INTRODUCTION

The Brazilian National Pilot Project on Telehealth, an initiative of the Ministry of Health through the Secretariat of Health Education and Work Management, through the Department of Health Education Management, which first discussions took place at the beginning of 2006 and it was finally implemented in 2007, was initially set at university in nine Brazilian states and it meant a huge challenge from its early days, due to several reasons.[1] When the project started, some of these states had already well established and consolidated Telehealth Centers with gathered and more diversified experience whereas others were beginners and had no experience whatsoever. This was an opportunity for the latter to receive implementation guide given by the centers with more experience. Thus, as Santos *et al.*[2] says *"Brazil National Health System (SUS) started to test telehealth projects on the public area in 2003"* (see also: Melo *et al.*[3]). On the other hand, the reality of each state even in the same region posed particular obstacles regarding communication infrastructure, institutionalization of Centers at the universities where they were located, technicians availability for support actions to the project, relationship with the Health Department in the states and municipalities, acceptance and participation of state and town level officials, support at the state the City Council of Health Secretaries (COSEMS), actions approval at the Inter-managing Bipartite Commission, understanding of the main implementation guidelines, among others.[3,4]

The two main guiding premises of the National Telehealth Program in Brazil are: support provided to Primary Healthcare, that is to say, the option to be given mainly to assist health professionals working at the Family Health Program (PSF), and the way in which this help is provided, what was commonly known as Second Opinion[5], with the aim of contributing to consolidate this healthcare model and with the continuing education of the professionals involved.[6,7] Both features are one of the arms or axis of the program, the educational one and although it is the largest and the most important one, the second axis which is the one on assistance should not be forgotten due to different reasons, and its importance must be taken into account. It is always interesting to verify that even in more assistance actions, there is always the possibility that health professionals working at the end of the system can improve their training when they receive remote support in their daily activities and thus they can also have a different attitude when facing a similar situation in the future. And together with the many other possibilities of distance support available today with the use of new technologies[3,8], cannot be ignored without a through analysis of its potential benefits.[9]

When the National Telehealth Pilot Project was implemented at the Federal University of Ceara there was already a team which previous attempted to implement a Telemedicine Project in the state but was not successful. Although it has to be said that it was a different model from the one which is running at the moment, a work that lasted almost three years. However, besides the wish to carry on after this first attempt, what it also remained was some experience in this group in charge of preparing the Telemedicine Project in Ceara, regarding the dimensioning of the main health related needs in the state. One of the most important tasks they carried out was the survey on which areas needed the assistance the most that was very useful to identify which teleassistance actions were more urgent and necessary.

Telecardiology and teledermatology were the main areas, followed by pediatrics, neurology and oncology still associated mainly due to the goals of that first project, the educational areas of telecare, which is the same as saying,

telehealth and telemedicine. Similarly, in that first project, it was not very clear the potential of Distance Learning, even in its more initial aspects, in its valuable role of improving training and qualification of health professionals.[10]

Nowadays in its second stage and no longer considered a Pilot Project but a specific reality and a government policy, it is evident that one of the most important achievements in the history of Public Health in the country, the National Telehealth Project[6,7,11], has in the Ceara Center an equally successful experience, with some obstacles but with very positive overall outcomes. The purpose of this piece of work is to describe the implementation experience of the above mentioned center, its main activities, main strategies in the attempt to overcome difficulties and the future expectations with special focus on the convergence with other important programs of the ministry itself, specially the creation of the SUS Open University.

MAIN GUIDELINES AND IMPLEMENTATION INITIAL PROCEDURES

The main guide ruling the installation of telehealth centers in the country came from the Act 35 of January 4th, 2007, that established the National Telehealth Program in the context of the Ministry of Health.[1] The 1st article states its purpose: *"… with the aim of developing supporting actions of assistance to health and above all, continuing education actions in Family Health, with the aim of education for the job and in the perspective of changes in the work routine, that will result in the quality of the Primary Care sector of the National Health System (SUS)". The 2nd article of the same Act defined "Compulsory and Indicative Criteria for selecting the municipalities of the states where the 900 units of the National Pilot Program on Telehealth applied to Primary Care will be installed".* Each Center was responsible for the task of implementing 100 access points in its own states, organizing the beginning of a communication infrastructure through internet, compatible with the work planned within the scope of the project. The first essential measures were: to establish a local team of the Center made up of a General Coordinator, a Project Manager (with administrative functions), an IT Manager and two mid-level computer technicians, each one being responsible for monitoring up to 25 installed access points. There were plans to hire two more if necessary. On August 6th 2007, the Telehealth Center of Ceara was officially open with a opening ceremony at Castelo Branco Hall at the Federal University of Ceara with a webconference broadcasted to the first Telehealth Access Point of the state, in the town of Baturité. Several health state and town officials were present at the opening ceremony. The Executive Secretary of the Secretariat of Health Education and Work Management, was also present and the Director of the Department of Health Education Management, Coordinator of the Telehealth Center of the University Hospital/Federal University of Minas Gerais, as well as the head of the State Health Department and the City Fortaleza Health Department, the president of the City Council of Health Secretaries, and several representatives of the selected municipalities, political officials and local university officials.

Since the Telehealth Center of Ceara is one of the first centers to be established without any previous experience in Telehealth/Telemedicine or even on Distance Learning, the Guiding Center appointed to help out in the installation process was the Telehealth Center of the Federal University Hospital of Minas Gerais, which team travelled to Ceara with part of her team about ten days before the opening, allowing intensive training for the local team, including local training in the town where the first access point was going to be installed. Some time before this, two partnerships made at the right time had an important contribution: the one with the State Health Department, that selected the municipalities from the state of Ceara that will receive the 100 access points of the Telehealth Program followed the guiding lines of Act 35, approved references at the Bipartite Inter-managing Commission meeting; and the partnership with the Council of City Health Secretaries of the State of Ceara. For instance, this Council was in charge of carrying out the survey in a very short period of time on how many and which were the municipalities of the state with regular internet connection and the quality of this connection. Until then this data was completely unknown. The survey also had to find out the initial interest in receiving the telehealth access points. On the one hand, the selection of the municipalities by the State Health Department tried to establish the likelihood of setting up a homogeneous coverage across the regions of the state, enabling even to establish visiting schedule to facilitate the implementation of the access points.

IMPLEMENTED MUNICIPALITIES

At the beginning, during the installation process of the access points it was established that the greater benefit would be achieved when the point was installed in a remote

place as far as possible from the center of the municipality, because it was precisely this type of places where the needs for remote support were more urgent, as a direct consequence of the poor access caused by the geographical barrier. However there were two factors that determined the preference for implementing the access points at main central city of the municipalities rather than in the more remote districts: first of all the high price charged by internet service providers to install the access points, the further the place the more expensive the access point. On the other hand, the fact that professionals working on the Family Health Program do not live in the same district where they work. They live in the center of the municipality or in the surrounding areas and commute to work every day to the districts where they are allocated. This determined a "short/long way" referral type of system both in local terms, in the municipality itself or in regional terms or even regarding the most advanced centers, which is not rare in the state capital. When any health-related problem appeared without a solution available at the Primary Health Care Unit of a given district, the initial step was to refer this case to the center of the municipality (short way), either to another Primary Healthcare Unit, a Health Center or even to a Hospital, depending on the urgency of the case. The cases that were not considered highly urgent and without a resolution given in the care available at the center of the municipality, are then referred to more specialized centers, generally with the possibility of providing health actions at the secondary and tertiary levels (long way). This was the reason why it was clear from the beginning that the greatest benefits for the Telehealth Project would be obtained if the access points were installed in the centers of the municipalities, preferably at the Primary Healthcare Centers or at Health Centers (in those municipalities where they were available), thus creating a first opportunity to intervene in the trend of patients referral (a highly expensive practice) with a clear huge impact on unnecessary removals and because it guides towards an attitude of only referring the cases that really need it.

Together with the first reason and bearing in mind the educational branch of the Telehealth Project, each access point installed should also enable other activities besides teleconsultations, such as talks, training sessions, research (mainly through the Virtual Health Library) and access to *online* courses using Learning Virtual Environments. If the access point was to be installed far from the municipality center it would be impossible to convince Family Health Program professionals to go to a remote place to do any type of activity after their long working hours for whatever reason. It is obvious that this rejection would be less if they had to move to a physical place at the center of the municipality where they all have to go anyway. However, it is expected the day when it will be possible to have the right conditions of connectivity in order to universalize all the functionalities of the Telehealth Project in each municipality and even to integrate them into an Electronic Health Record. The state of Ceara may be close to these goals since it is keeping up with some initiatives of the state government.

THE IMPLEMENTATION PROCESS OF THE ACCESS POINTS

Once the team was structured and trained with the help of the Minas Telecardio Project Team, and after the main partnerships were established, the training received, the municipalities selected and its connectivity with internet known, and once the project was officially open, the implementation phase of the telehealth access points in the state started, however with pre-defined strategies. The first one of them was to prepare a guide to be sent to each selected town with the minimum operating requirements of the telehealth access point. The documents to be signed by the town officials were also prepared (Table 1).

Table 1 - General Requirements for Implementing a Telehealth access point

Minimum requirement for staff and installation	Physical dimension, location, furniture and alike	Connectivity and equipments	Documentation signed by town officials
- Nursing assistant or technician (preferably with full dedication); - A computer technician with basic knowledge when necessary; - A place inside the Health Center or the Healthcare Center in the center of the municipality; - To avoid the implementation in Hospitals (the character of Primary Care has to be kept).	- Room with minimum capacity for ten people, exclusively used for the access point; - A table (and chair) for the computer and the printer; - A stretcher; - Acceptable lighting and ventilation conditions; - Requirements of physical safety.	- Minimum *link*: 256Kb; - Exclusive connection for the access point; - To avoid wireless connection; - Equipments to be exclusively used by the Telehealth Project.	- Term of Commitment; - Term of Responsibility; - Usage policy.

Once the availability of the minimum requirements is confirmed according to the guides sent, the project technicians carried out the connectivity tests in order to ensure that at the moment of the team visit the implementation could be done without any problem. Even so some municipalities only managed to finish the implementation on the second or third visit. There was an attempt to build a visiting schedule, setting a traveling route for each region and in every town a meeting was held with all professionals working in the Family Health Program activities as well as with community agents. This was an excellent opportunity to talk longer about the project with the participation of all members of the Family Health Program Teams, trying to avoid formalities in the event and encouraging their participation mainly in terms of expressing their needs and interests. This feedback was essential for future educational actions to be made available at the Center. Whenever possible, these implementation visits were followed up by a State Health Department representative with the purpose of showing the importance of the so much needed partnership for the harmonious development of the whole process.

Visits to each municipality were always full of rewarding acceptance and interest, unless for a few of them where the local officials or their main managers were not even present when the team arrived. With this little interest showed, these towns were placed at the bottom of the list for implementing the access point (trying to avoid its total removal from the project). Since this type of situation was predicted beforehand, a request had been sent to the State Health Department and also to the Bipartite Inter-managing Commission to select a percentage of at least 20% higher than the 100 total access points planned to be installed. In the case of not being possible to install the access point in one given town this will made other locations already selected available, without having to re-start the selection and approval process. There were two strong reasons to not remove completely the towns from the process after one attempt, on the one hand it would avoid the embarrassment of being removed that will contribute to a growing sense of lack of interest on the project, and on the other hand, it would help to try to get the participation of managers, predicting a future where the Telehealth Program could be present all over the state of Ceara. Once the 100 access points were installed according to the schedule of the Telehealth Project for the state (with a total of 184 municipalities), it is expected that the natural evolution enables to extend the benefits of the project to all the state.

Bearing in mind the survey of the needs made when they first tried to implement a Telemedicine Project in Ceara, already mentioned in this article, showing the poor assistance provided in cardiology and placing this area as one of the most urgent to be solved, and considering that the center allocated to support the installation process in the state of Ceara was the Federal University of Minas Gerais Hospital with its Minas Telecardio Project, it was absolutely normal to start the work by offering services in telecardiology in Ceara. This model was completely innovative for the time because the cardiology teams offering the remote service were those already working in the state of Minas Gerais, due to the impossibility of organizing cardiologist teams at the recently implemented Ceara Center in such a short period of time. The collaboration with Minas Telecardio was beneficial and the results were quite impressive. Very soon and with little over ten municipalities implemented and offering regular services on telecardiology, the volume of care was rapidly increasing confirming the need previously identified. Some details deserve an extra comment because they represent a relevant contribution in remote care using new technologies.

THE IMPLEMENTATION PROCESS, DIFFICULTIES AND SOLUTIONS

From the beginning the two main difficulties found in the implementation process were clear. These were the poor and irregular quality of internet access in most municipalities and the lack of computer technicians even with elementary level to support daily situations that could be solved with a simple consultation to the technical support service available at the center. However the inadequate bandwidth not only happened in the inner towns far from the technological resources, as it is described below.

Among the several initial guides of the Department of Health Education and Work Management/Ministry of Health for the implementation process, one of them established that out of the 100 units to be implemented, 20 would have to be for the metropolitan area of the state capital, where the Telehealth Center was located. In a monthly meeting the Bipartite Inter-managing Com-

mission decided and approved that 10 of these 20 units would have to be in Fortaleza, and the rest would go to the metropolitan area (six municipalities). Due to the fact that in the metropolitan area of Fortaleza there were fewer towns than the telehealth access points allocated, the cities of Sobral in the north and Juazeiro in the south of the state were selected to receive an additional point. Interesting enough these two were the only cities that had not installed yet their access points.

In Fortaleza it was impossible to solve the problem of the communication bandwidth much lower than the minimum established (January 2009). Thus a request was sent to the City Health Department (and to the Bipartite Intermanaging Commission) asking for approval to re-allocate the ten points following the selection already made when the cities were chosen. Therefore the percentage chosen above the maximum planned number of implemented points is a waiting list subject to be used when needed, which in fact happened in this particular occasion and at other times. Another important guide entirely accepted and enforced was the implementation of a telehealth access point at the entity representing the SUS Technical School that in the case of the state of Ceara is the Public Health School (*http://www.esp.ce.gov.br*).

Another problem faced at the beginning of the access points implementation was due to the fact that the National Project had not planned in a very clear way the possibility of paying the consultations nor the acquisition of equipments, except for the computers, printers, webcams, headsets and sound accessories for each one of the access points. These equipments made up the basic kit given by the project to each town selected at the moment of the implementation through the signature of the documentation by the Health Department and by the Mayor of the town, formalizing and consolidating the required partnership and essential commitment for the success of the project (see Table 1). However, although the kit was offered by the project it was not possible to acquire the digital ECG devices, a promise made by the City Health Department on the day the project was officially launched, but that it took a very long time to be delivered. Therefore, it was necessary to look for alternative solutions. A clear finding of the experience is that the more support received by the town officials the better the project works.

The computers delivered by the project, acquired with a previously discussed specification used Windows XP^{R} operational system, mainly because of its compatibility with the program used with the digital electrocardiography equipments. The Federal University of Ceara had already purchased an academic license from Microsoft, some time before, and this made it possible to acquire computers without the operational system that after being delivered to the Center would receive this basic program with the license provided by the Data Processing Center of the Federal University of Ceara. The rest of the configuration for the proper functioning of the equipment was also made. This implied a significant savings for the project.

Another way of reducing cost was also the use of owned programs. For telecardiology actions besides the computers with an operational system compatible with the working program of the ECG devices, it was also necessary to use a communication program and the only choice was the SameTime^{R}, by Lotus^{R}, at the time owned by IBM^{R}. This alternative solution was based on the choice made by the Minas Telecardio Project which had already chosen this communication program for its service. Luckly enough the Federal University of Ceara had also acquired another academic license for this communication program which meant more money saved for the project. Another source of savings was offered by the complete training and initial support provided to the team of the Ceara Unit by the team of Minas Telecardio. The amount of money saved in these three situations made possible the acquisition of some of the most important devices enabling the beginning of the telecardiology service.

TELECARDIOLOGY

It was evident that the telecardiology service provided to the municipalities in Ceara generated a relative cost to the activity of the on duty cardiologists working at the Minas Telecardio Project. These professionals were paid through the Medical Work Cooperative of the University Hospital of the Federal University of Minas Gerais and during the first six months, this work was done without receiving any payment (they were paid later). When 23 towns were covered by the service, generating a volume that represented about 1/6 of the whole service provided by Minas Telecardio (at the time with approximately 130 access points), it was very clear that this had to be a paid service. Payments finally were made with the authorization of the National Coordination of the Telehealth National

Project. Unfortunately at the beginning of 2009 it was not longer allowed to transfer money among the Telehealth Centers. This prohibition contributted to cancel the telecardiology service at the National Health System (SUS) in the state of Ceara from January 2010 (this is the situation until today).

The positive outcome of this remote assistance activity had such an impact that some municipalities even bought their own equipment, others wanted to implement two electrocardiographs in the same town. This interest made it possible to extend the service and to achieve the acceptance of the Telehealth Program in general. On the other hand, it confirmed the need already known regarding the poor conditions of the cardiology care in the inner part of the state. With this experience it was possible to have some quantitative data on this problem. Figure 1 shows the quantitative data of the work done in telecardiology during 2008 and 2009 (ECG: number of exams done; DCC: number of case discussions requested; URG: number of urgent cases seen).

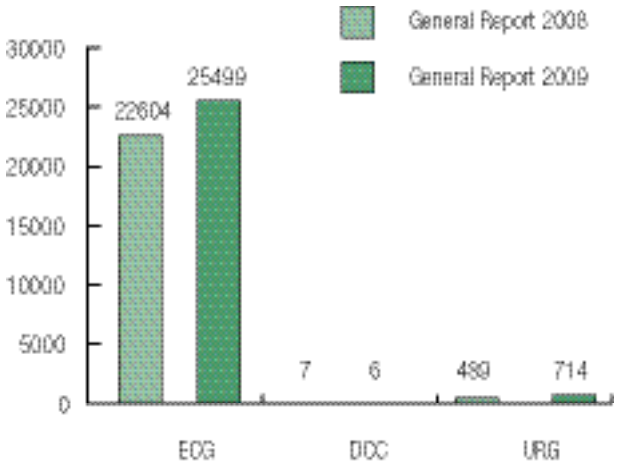

Figure 01 - Results of the Telecardiology service during 2008/2009.

The installation strategy of the other access points changed after the first ten. Based on the successful experiences described by other centers, the training of the teams started to be done at the Center itself now equipped with a proper Computer Lab donated by the University Telemedicine Network Project (RUTE), of the National Network for Education and Research (RNP), of the Ministry of Science and Technology. This help is only one of the many benefits provided by the National Network for Education and Research to the several Centers of the Telehealth National Project. We could never stress enough that both initiatives, The Telehealth National Project and RUTE, are an inspiring example of inter-ministerial dialogue, being excellent partners from the beginning.

In this new training scheme the municipality selected to receive the access point had to send in a previously scheduled date, at least two representatives (one of the healthcare area and a technician). The training sessions lasted for about 4-6 hours approximately for each group of ten towns. These same representatives would bring with them the documents signed by the town officials and would take the equipments back with them on a leasing scheme. They were responsible for setting up the equipments in the right place with a close monitoring of the center technicians that had previously carried out the connectivity tests. This scheme worked well until some time before the towns elections in 2008. Then the process stopped completely for almost 90 days before and after this election period. Finally on January 2009, the process started again very intensively in order to achieve the goal and the commitment agreed of implementing 100 access points.

With some new mayors newly elected there were also changes in the city health department teams that needed to be trained. The requests for new training were dealt with as they appear, sometimes for one town, other times for several towns at the same session. In some cases, there were requests to train previously trained people who wanted to recycle their knowledge. A very important aspect of these training sessions was the complete support and partnership with the digital ECG device manufacturer whose local representative was always ready to help providing an equipment for the training and explaining how it worked (including the program used). The team of the center was in charge of explaining the project, the communication program and the ethic and legal aspects implied in the telemedicine activities across the country. It is important to note that due to ethical factors, these training sessions were done with a completely healthy person without any previous heart related complain. The cardiologists from Minas Gerais were always present in these training sessions, not only doing the ECG and the remote report but with the communication program used and complying with all the safety and privacy criteria; it was possible to offer an immediate consultation to the physician at the remote location on the removal of the patient or even in an emer-

gency situation that even helped to save several lives, as it has been documented. Since both the consultant and the consultee were geographically apart the telecardiology activity was duly communicated to the Regional Medical Boards of both states.

TELEDERMATOLOGY

As it has been said, the second area with a very urgent need in terms of care in the state of Ceara was dermatology. The two main difficulties to implement a regular teledermatology service were the lack of a specific category for such purpose and a more prosaic reason, the large lack of knowledge on basic topics of digital photography of the professionals involved. This lack of knowledge ranges from which was the right equipment to buy to the most elementary knowledge on its operation in order to meet the minimum requirements that will enable the remote analysis of skin lesions photographs in a safe manner. The first step was to identify a professional who will be willing to participate in a pilot program without being paid and at the same time to organize a lecture on the basic principles of digital photography done by video-collaboration with webconferences. Once the webpage of the Telehealth Center of Ceara was up and running, this lecture became permanently available in its web address by *videostreaming*. It was even possible to download its content. An additional help came when it was possible to acquire a batch of amateur digital machines distributed to encourage even more the teledermatology activity.

SCHEDULE OF TALKS AND SECOND OPINION

Starting a regular program with weekly classes without money to pay the lecturers and without a clear feedback on the topics of interest for the teams of the Family Health Program, and using an almost unknown technology that was facing connectivity problems, was a very significant challenge.

The following strategies were used to convince the speakers to participate: it was made very clear from the beginning that there was not payment, although work was being done to get a deserved payment (what happened later); the speaker was asked to choose or prepare a talk on a topic that would be of the interest of Primary Health Care professionals. This topic could also be chosen from some previous request already solved with the same purpose, since many of them had already been invited to deliver a talk for Primary Care professionals, because they work at a University Hospital where they primarily deal with the National Health System customers. The topic could also be chosen from their own individual practice, both at a University Hospital or at any other institution whenever they judge that a given piece of knowledge was important, for example, to avoid the removal of a patient. At the beginning this activity was mostly done by physicians, later the Nursing Service of the University Hospital of the Federal University of Ceara started to participate. After every lecture the participants received a Participation Certificate signed by the Coordinator of the Telehealth Center and by the Head of the School of Medicine. Presentations were carefully monitored by the technicians of the center for two reasons. First of all they wanted to find out how many access points participated and how many professionals in each point, and also the satisfaction with the topic discussed. The results were better than expected, since the main problem was not to find speakers or relevant topics to cover but the poor quality of the connection at the municipalities. Overcoming this connectivity issue demanded inventiveness. It was soon realized that webconferences with SameTime® were unstable on low quality connection situations, very common at the places where the access points were located. The search for alternative solutions of free software led to the DimDim System[19] used since then with excellent results. Another aspect noticed since the beginning was that many presentations had unnecessary high resolution images, making its broadcasting very difficult in low band situations and reducing the video-collaboration quality. It was then asked to the speakers to send a copy of their presentation by email or in an electronic mean, so that the technicians could reduce the size of the photos or figures without reducing the quality of the talk and obviously without altering the content or any other aspect of its format. The speaker would then review the material sent by the technician.

In a relatively short period of time there were a consistent number of talks together with an idea of the acceptance of the method, the worst and best days and times for the activity. Several locations suggested a monthly schedule of the talks to be sent on the previ-

ous month for better disseminating the activity among those interested. This suggestion was quickly put into practice. The advance of this scheme was reached with the recording of the talks that were later available by streaming, as soon as it was possible to publish the electronic page (nowadays a Portal) of the Ceara Telehealth Center.

The use of the videocollaboration tool did not only offer the schedule of the talks. It was also used for real time consultations. In this regard, SameTime^{R} proved to be equally inadequate. This software requires high quality connection band, something not available in most Telehealth Access Points in the state of Ceara. On the other hand, this system has the advantage of allowing the encryption process (128bits), with a positive impact on the safety and privacy of the information and data sent. Using a lighter software without this resource makes video-collaboration less safe in theory with the need of using some other measures. The first one must be to record all teleconsultations through a previously defined schedule. Both consultant and consultee must identify themselves and in the case of physicians they have to state their registry number at the Regional Board of the State of Ceara and the place where they are allocated. Municipalities receive instructions to be sent to the future professional users explaining the meaning of the service within the concept of Second Medical Opinion.[5] Finally, in order to use DimDim safely a relatively easy device was used: *"a simple solution for overcoming the fact of not having native encryption (as in SameTime^{R}) was to install the applicative in the local server and using the HTTPS protocol by 443 port. This is known as a very safe procedure (used for internet banking transactions)".* This report was presented on the IV Brazilian Conference on Telemedicine and Telehealth and on the II Workshop of the Laboratory of Excellence and Innovation on Telehealth, December 9th to 12th, 2009. Short before an offline teleconsultation tool had been added to the Telehealth Portal in Ceara (see results on Table 2, for 2009).

CURRENT SITUATION

More than 90% of the 98 access points installed are fully operational. For several reasons, there is always less than 10% that either does not follow the regular activities of the center or have not started yet any kind of activity, in general terms due to lack of interest or lack of knowledge of the advantages offered by the Telehealth Project. In most cases problems regarding connectivity and availability of technicians remain, although a permanent on duty service offering support to the points has been and keeps on being quite useful. This is even more so when video-collaboration activities are carried out since it is the time when there are more connectivity problems to be solved. This on duty support service worked in partnership with the on duty service of Minas Telecardio, until the day it was operational, enabling both states Ceara and Minas Gerais to receive the service by the on duty technicians in both locations.

The telehealth team in Ceara was benefitted when a physician with specific training on Family and Community Health joined the team at the end of 2009, working mainly with regulation and aiming to coordinate the Second Opinion work for the municipalities with installed access points, implemented on December 2009 with the goal of facilitating the conduct of Primary Healthcare when they have to deal with a doubt at their daily activities.

When the professional has a doubt he/she sends the request to the regulating physician by the telehealth project webpage that can be accessed from any place with internet connection. The physician will analyze the request sending it either to a Family Physician, in the case it is a doubt on Primary Healthcare practice, or to a specialist physician if the doubt is related to Secondary or Tertiary Care. Nowadays the Telehealth Center in Ceara has the following specialties: head and neck surgery, plastic surgery, general practice, dermatology, gynecology and obstetrics, infectology, neurology, pediatrics and urology.

Due to this and other large projects in which the Federal University of Ceara has taken part, it was recently open the Center of Technology and Distance Education on Health, where it used to be the Laboratory of Computer Science of the School of Medicine, replacing the former Study Group on Information Technology and Telecomputing on Health. The ideal scenario would have been to create such Center as a supplementary entity of the university, similarly to the NUTES of the Federal University of Pernambuco[3], what unfortunately was not taken into account by the higher administration of the Federal University of Ceara.

Table 2 - Nº of total teleconsultations per Specialty

Municipalities	Specialities	Amount	Total
Aratuba	Head and Neck Surgery	1	1
Barroquinha	Dermatology	8	8
Carnaubal	Head and Neck Surgery	1	65
	Dermatology	45	
	Neurology	9	
	Urology	10	
Caucaia	Neurology	1	1
Choró	Dermatology	10	10
Crateús	Dermatology	2	2
Guaraciaba Do Norte	Dermatology	19	19
Ibicuitinga	Dermatology	2	3
	Gynechology/Obstetrics	1	
Iracema	Head and Neck Surgery	1	5
	Dermatology	2	
	Neurology	1	
	Pediatrics	1	
Irauçuba	Dermatology	10	10
Icapuí	Dermatology	2	2
Itaiçaba	Dermatology	1	2
	Plastic Surgery	1	
Maracanaú	Dermatology	29	29
Milhã	Dermatology	98	99
	Pediatrics	1	
Ocara	Head and Neck Surgery	1	25
	Dermatology	19	
	Gynecology/Obstetrics	1	
	Neurology	3	
	Urology	1	
Piquet Carneiro	Dermatology	14	14
Poranga	Dermatology	30	30
Quixelô	Dermatology	1	1
Santa Quitéria	Pediatrics	1	1
Santana Do Acaraú	Dermatology	9	9
Solonópole	Dermatology	2	2
		Total during the year	338

FUTURE PROSPECTS

The main prospects for the consolidation of the National Telehealth Program in Ceara are mainly based on two factors: the improvement of the connectivity in the municipalities, in order to increase and extend the quality of the services provided today and a greater partnership with the local government entities in order to increase their participation on this and other programs being implemented (specially the UNA-SUS project), to facilitate the integration of the several projects. In addition, there are other projects also financed by the Ministry of Health, such as Pro-Health[14] and the PET Health, enabling its complementarity, which will contribute to achieve better results than those obtained by projects done without partnerships or collaboration in different levels. An example of this effort in Ceara happened with the PorangabusSUS Integration Seminar, held on December 4th, 2009, an initiative of the Pro-Health program with the aim of improving and strengthening the integration of the projects which are currently operating at the Federal University of Ceara with the State Health Department, at the state level and with the City Health Department at the city level and even within the University itself.

CONCLUDING REMARKS

Wootton *et al.*[15] says at the beginning of the preface of the first edition of his book: *"one of the most punishing experiences for a physician is to find out that he/she could not give a diagnosis because he/she never heard about a disease before"*.[16] He keeps on saying: *"at the end of the day, what is the purpose of all that training,…other than learning how to classify all known possibilities? On the other hand, which doctor does not wish to provide his/her patients with the most efficient and effective diagnosis techniques and treatments available? If the disease is not known, then it is not possible to diagnose it. When the treatment is not known, then it is not possible to offer it".*[24] In the current days, it is compulsory to remember that the best diagnosis and treatment possibilities must be based on the best evidences available. Since it is impossible to have a complete trained professional after a university course on any health related area, it is necessary to acknowledge the need for providing support for the future professional exercise of these people, specially when they work in remote places.[8,16] In addition to this there are many factors that do not allow health professionals to be updated, such as the high amount of scientific production, the long tiring working hours and the fight for survival in the current society, although the impact on the quality of the service caused by the lack of professional training is clear.

If there are clear reasons to implement continuing edu-

cation policies for health professionals working on the National Health System due to the reason above mentioned regarding only the students leaving the university now and who still will face the professional market, it is equally important to provide support for those professionals who are already working but whose training did not take place on schools where the main approach was their preparation for Primary Care. This makes even more necessary to join efforts to overcome this training gap providing them with tools to solve the barriers of distance and time with on the job training or taking them as little time as possible from their working places without reducing the quality of their training.

Therefore, there are two distinct situations that are overlapped and connected: firstly it is necessary to provide support to the professional activity itself and this demands information exchange, based on what has been called the Second Opinion. The second challenge is to provide specific distance training, that is to say, to create conditions to specialize those professionals on Primary Health Care on Family and Community Health, and at the same time offering tools to enable permanent education for all.

In the current Society of knowledge a possible solution has to do with the use of the New Information and Telecommunication Technologies, together with *"the process of technology mediated teaching and learning process"*, called Distance Learning[17], and in the semi-presence type of training, through which it is possible to put into practice Telehealth and continuing training actions using the same infrastructure. This is why it is equally necessary to integrate Telehealth and UNA-SUS projects[12], that the state of Ceara has been trying to implement since the beginning of the second project. And the success of these joint efforts depends on the partnership and integration of the efforts made by the involved stakeholders.

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