

Telehealth in the Amazon: development, results and perspectives



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Abstract

Known for its thick forest and some road transportation deficiencies, the Amazon region has problems with one primary issue for the public sector; the health of its population. Only 5% of the Brazilian population lives in this region which occupies approximately 40% of the national territory. Health care in the Amazon includes a range of issues to be solved by public authorities, the most important one is the difficulty to diagnose and treatment several regional diseases which have their own clinical features. This is why the Telemedicine Center opened recently in the region is an inclusive innovation for the population, having a positive influence on the development of telemedicine for the area known as the Legal Amazon. Among the most immediate benefits of the Telemedicine Center for the Amazon Region, the main ones are to improve the health care quality for the population and to support health professionals very much isolated from the rest of the country, as well as monitoring the endemic diseases of the region. This piece of work will show the important progress achieved on isolated population health care in a short period of time. It also shows the long journey made with its difficulties and the technical information from the implementation to the consolidation of the Amazon Center on Telemedicine.

Key words: Telemedicine, Telecare, Tele-education, Amazon, Remote areas, Care

Resumen

Telesalud en la Amazonia: implantación, resultados y perspectivas

Conocida por su densa selva y algunos problemas de transporte por carretera, la región Amazónica presenta problemas en una cuestión considerada primordial para el sector público; la salud de la población. La región, que ocupa aproximadamente 40% del territorio nacional, es el lugar donde vive apenas 5% de la población brasileña. El área de la salud en la Amazonia engloba un abanico de cuestiones que el poder público tiene que solucionar, entre las que se destaca la dificultad de diagnosticar y tratar las diversas enfermedades regionales con características clínicas propias. Es por eso que la reciente formación de un Centro de Telemedicina en la región es una innovación inclusiva para la población, que influye positivamente en el desarrollo de la telemedicina para la Amazonia Legal. Los beneficios más inmediatos de la creación del Polo de Telemedicina de la Amazonia son mejorar la calidad de la atención a las poblaciones y apoyar a los profesionales de la salud (todos muy aislados del resto del país y también monitorear las endemias de la región). Este trabajo mostrará cómo en un corto período de tiempo, hubo avances significativos en relación a la atención a las poblaciones aisladas, mostrando la larga trayectoria, sus dificultades y las coordinadas técnicas desde la implantación a la consolidación del Núcleo Amazonas de Telemedicina.

Palabras clave: Telemedicina, Tele-asistencia, Tele-educación, Amazonas, Áreas remotas, Asistencia

Telessaúde na Amazônia: implantação, resultados e perspectivas

Conhecida por sua densa floresta e alguns problemas de transporte rodoviário, a região Amazônica apresenta problemas numa questão considerada primordial para o setor público; a saúde da população. A região, que ocupa aproximadamente 40% do território nacional é a morada de apenas 5% da população brasileira. A área sanitária na Amazônia engloba um leque de questões a serem resolvidas pelo poder público, entre as quais se destaca a dificuldade de diagnosticar e tratar as diversas doenças regionais com características clínicas próprias. Por isso, a recente formação de um Centro de Telemedicina na região é uma inovação inclusiva para a população que influencia positivamente no desenvolvimento da telemedicina para a Amazônia Legal. Melhorar a qualidade dos atendimentos às populações e apoiar os profissionais de saúde (todos muito isolados do resto do país), e ainda monitorar as endemias da região são os benefícios mais imediatos que a criação do Pólo de Telemedicina da Amazônia deve agregar. Este trabalho mostrará como num curto período de tempo, foram feitos progressos significativos quando ao atendimento às populações isoladas, mostrando a longa caminhada, dificuldades e as coordenadas técnicas da implantação à consolidação do Núcleo Amazonas de Telemedicina.

Palavras-Chaves: Telemedicina, Tele-assistência, Tele-educação, Amazônia, Áreas remotas, Assistência

INTRODUCTION

The fact of living in the interior of the Amazon involves situations in which the decision to remove a patient may cost his life or even exhaust financially the public health care system. In this context telehealth is becoming a tool for assistance and education because while solving a problem it can also be educative. Besides improving quality of life of the population of remote areas, telehealth can be economic for the system by avoiding unnecessary transportation.¹

The Amazon deserves highlights because it is a regional center in which social health and education can only be rescued by telecommunication technologies allied to informatics. It is also one of the most concerning areas internationally, being named geopolitically Legal Amazon. It must consider that a great amount of the population is excluded from national progress benefits and that Legal Amazon has enormous problems in social and economical issues.

In this context, the Telemedicine Center for the Amazon Region (PTA), created formally in 2004 at State University of Amazon (UEA), arose with the need to offer educational content, professional training and medical assistance provided by teleconsultation to doctors in the interior of Amazonas, considering geography, social and economical level and resources, and still, public policies.

In Brazil, telehealth was initially established in nine states, with the purpose of offering essential benefits of health care to poor population that live outside the great centers of development. In order for this purpose to be accomplished telehealth requires the interaction among federal, state and local sectors, as well as private technological

companies, so that the service can be offered successfully in difficult areas such as the Amazon, and areas with diverse social and economical aspects.

The transfer of patients from the interior to Manaus has become very expensive for the local governments, since usually the way to transfer is via airplane, especially in difficult cases of urgency. However, criteria to identify who, when and how to remove a patient are still subjective and depends on the experience and judgement of the attending doctor.

The improvement of these decisions of removing or not a patient would bring a large impact on quality of life and assistance to this population and would be financial criteria to justify the development of the Telehealth Project in support to primary care.

The review of the number of teleconsultation it is important to know the average cost of a real removal from some counties in Amazonas in order to understand the economy and power that the correct usage of telehealth can represent for Amazonas, according to the Figure 1.

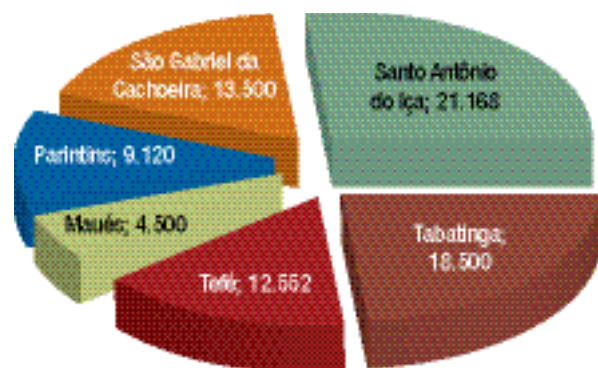


Figure 01 - Cost to remove patients from other municipalities to Manaus by airplane.

OBJECTIVES

To investigate the implementation of telemedicine in interior municipalities of Amazon state; verifying the process of population assistance, benefits and economy generated to these events in 2008.

Because it is a recent experience, telemedicine is still a not very well known activity in the region and the results are not yet completely evaluated. This is the context in which the research takes place.

RESULTS

Nowadays, telehealth is present at twenty-two municipalities through the Amazon Center on Telemedicine (Figure 2), benefitting 146 Family Health Teams (ESF). This data shows the impact regarding the effectiveness of the telepresence of a specialist in municipalities and remote regions of the Amazon where it is impossible or, at least, unlikely to maintain an expert because of financial issues.



Figure 02 - Map shows the municipalities in Amazonas with communication by satellites installed by National Project of Telehealth.

Teleconsultations using formative second opinion, which totalized 356 (Figure 3) and 1.320 support exams in 2008, mean that almost a thousand people did not have to be removed to Manaus searching for specialized doctors or exams. Telemedicine also provided permanent health education for 4.443 people (Figure 4).

By comparing the number of tele-education activities and the participants in lectures and courses promoted by the Amazon Center on Telemedicine with the other nine states where the Telehealth Program is installed, we can ob-

serve that Amazon was the state with the greater number of tele-education actions in 2008, according to the Figure 5.

By observing tele-assistance as another part of telehealth, the Amazonas state was the third largest movement in teleconsultations in Brazil in 2008, while Minas Gerais and Rio Grande do Sul had more teleconsultations, but still Amazonas was part of the consolidation of telehealth (Figure 6).

Another aspect related to tele-assistance are the specialties consulted in 2008, in which we had a clear demand for dermatology when compared to other specialties.

DISCUSSION

TELEMEDICINE AS A TOOL TO DIMINISH DISTANCES

Telemedicine Center for the Amazon Region

Telemedicine is still a not very well known activity in our region and the results are not fully evaluated yet because it is a recent experience. This is the scenario in which this paper is inserted.^{2,6}

There are estimates that say that Legal Amazon has 21 million inhabitants. It is still the region with the lowest demographic density in Brazil with 3,67 inhabitants for each km², yet it is definitely the one that grows the most: there is data that defend an annual growth of 4,5% comparing to an average of 1,8% for the rest of the country. The urban concentration is a little higher than rural (55% against 45%).

Data from Regional Medical Council of Amazonas demonstrate that this state has 3.178 doctors working, distributed in this manner:

- Manaus: 2.972 doctors – 93,5 % from total;
- Interior: 207 doctors – 6,5 % from total.

According to IBGE, Amazonas total population, today is 2.817.252 inhabitants, distributed in this manner:

- Manaus: 1.592.555 inhabitants – 56,5%;
- Interior: 1.224.697 inhabitants – 43,5%.

Considering data above it is possible to infer that Manaus has a little over half of the population and almost every doctor available in our state, while interior is only supplied with 10% of medical doctors available.

This reality has not changed in decades. From a total of 62 municipalities in Amazonas, three do not have any medical doctor. Another fact is that no investment in qualification and recycling of professionals was made in the interior of our state until this day.

The Telemedicine Center for the Amazon Region was arisen from the partnership between State University of Amazon and Medical School of the University of São Paulo (FMUSP), with the support of Regional Medical Council, by the means of a technical cooperation agreement signed in December 14th, 2004.

The project also receive the Amazon Protection System (SIPAM). Because of this new partnership we could connect remote areas of Amazonas trough VSat. In this way SIPAM had an essential participation in the development of telehealth in the region.¹

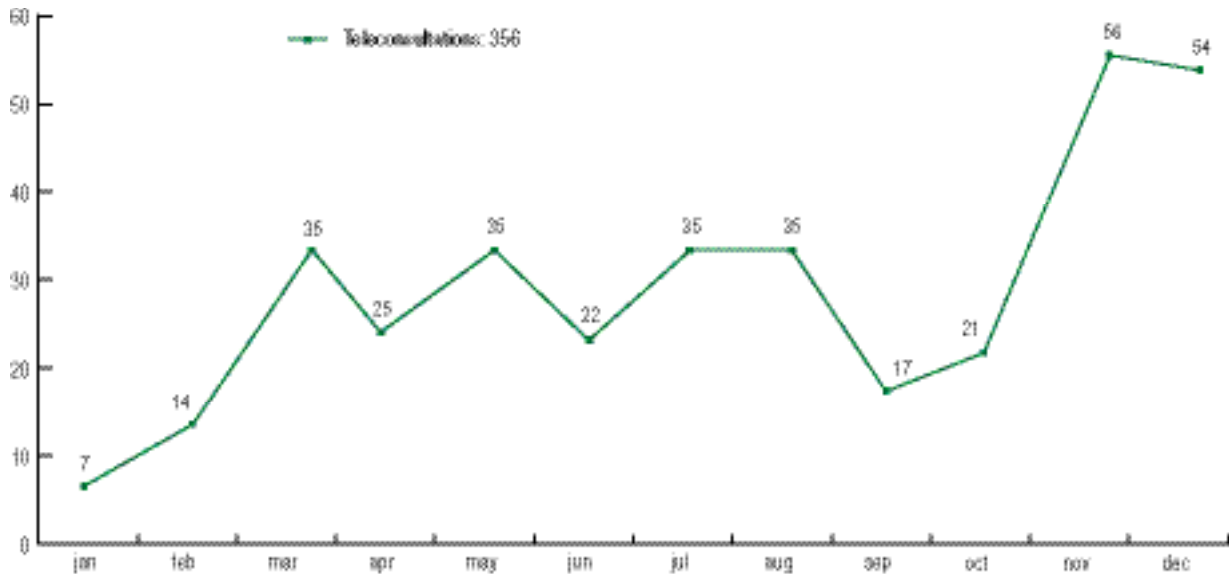


Figure 03 - Amount of monthly teleconsultations by webconference or videoconference at Telemedicine Center of Amazon in 2008.

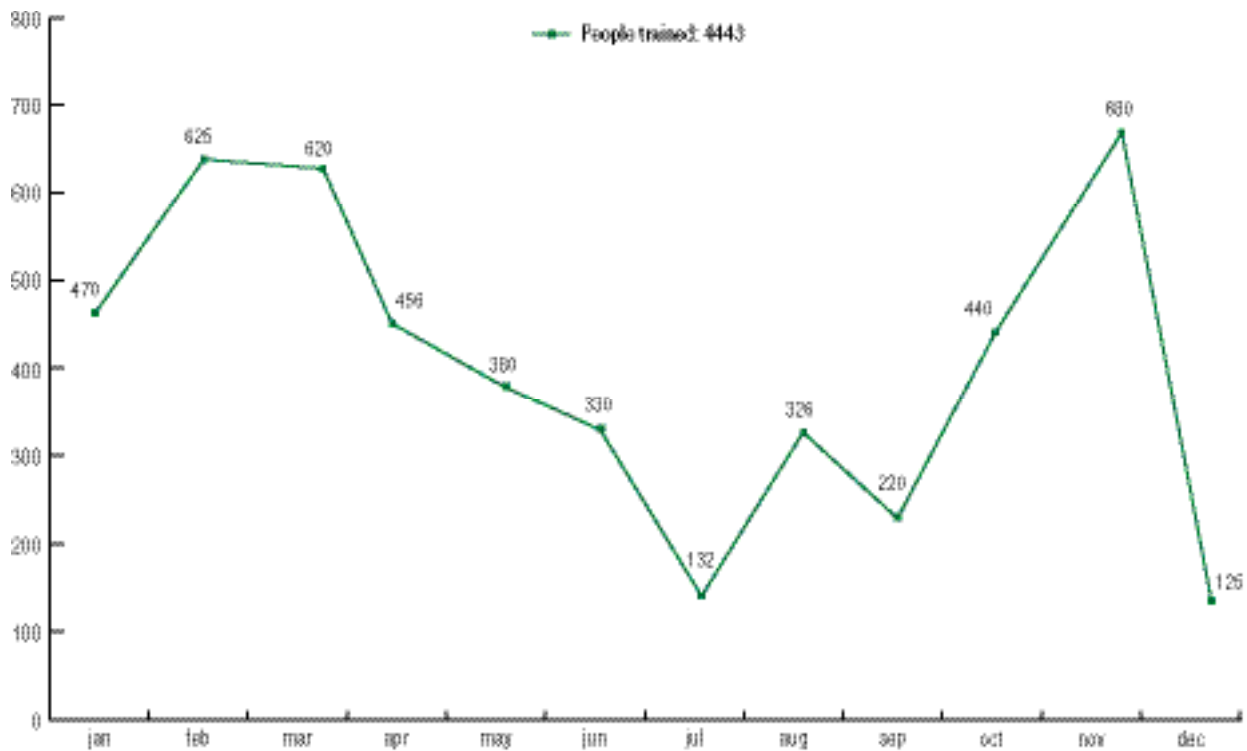


Figure 04 - Amount of people trained monthly at Telemedicine Center of Amazon in 2008.

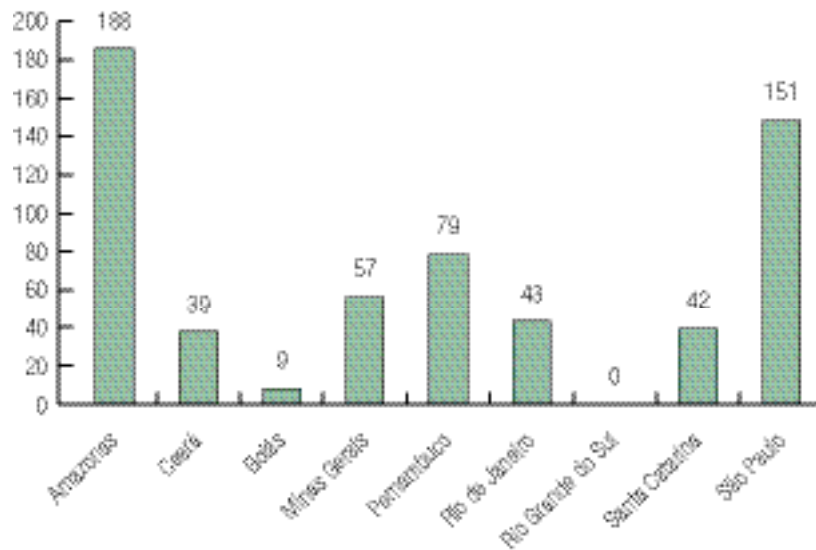


Figure 05 - Tele-education activities in Brazil in 2008.

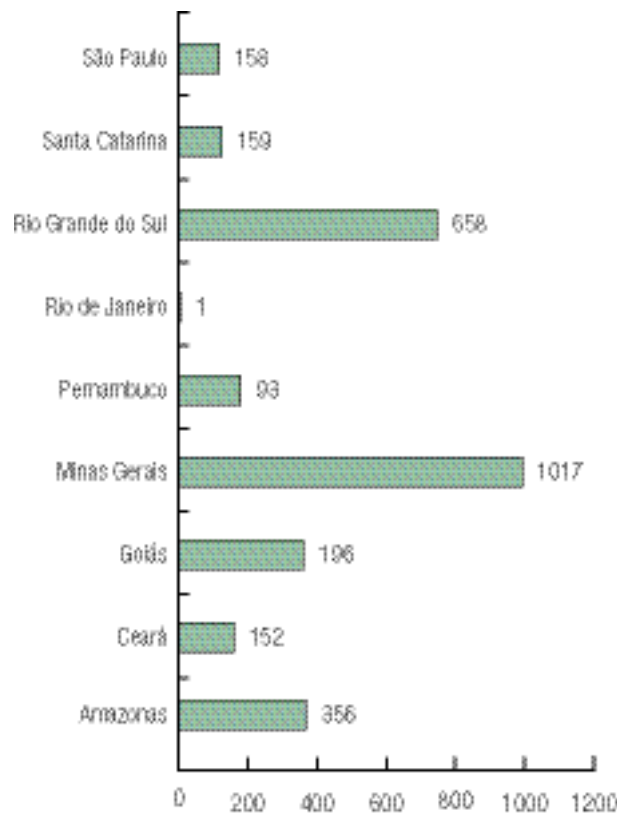


Figure 06 - Teleconsultations in Brazil in 2008.

The great problem regarding telehealth development or any other digital inclusion program in the Amazon is connectivity. The Electronic Government Service to Citizens - Ministry of Communications (GESAC) program from Ministry of Communications, through a technical agreement

with Ministry of Health, has made available 17 centers in interior Amazon to serve as connectivity reference for telehealth activities.

A great deal of what was done in telehealth in the Amazon used a GESAC-MC link. In August 2008 a review was performed in order to evaluate the critical points and improve the development of this partnership.

The GESAC-MC program provides a internet link of 256 Kbps distributed in 10 machines in 17 municipalities.

Since the GESAC-MC antenna is located at a state school it was necessary to transmit using wireless radio signal the same signal to a health unit (Figure 7).

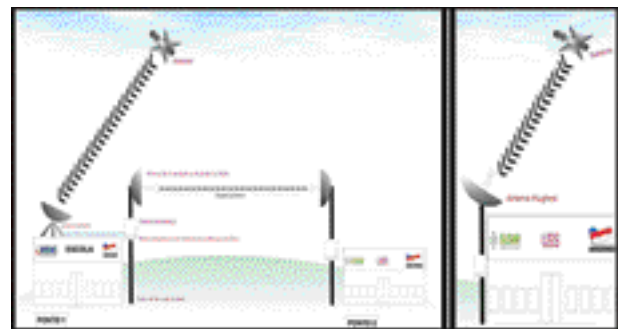


Figure 07 - Patient receiving assistance through teledermatology, 780 Km away from Manaus, and accompanied by undergraduate students at State University of Amazon.

In order to develop our activities in telehealth, the Ministry of Communications improves this connection to 1 Mbps during specific days and hours, which are

solely for teleconsultation or health tele-education in these municipalities.

A relevant aspect to be considered is the pattern of connectivity granted by GESAC-MC to the Telemedicine Center for the Amazon Region. Despite the effort in collaborate with the development of telehealth in the Amazon, only 39% of the requests for connection were effective via GESAC in 2008. Many reasons contributed to a connectivity loss of 61%, such as technical problems, band insufficiency, climate issues, the absence for a physician or the patient, etc.

Even though we had all these problems, the Telemedicine Center for the Amazon Region was able to perform all those activities that were described so far, and this fact resulted in a acknowledgement by Ministry of Health of the need to improve the system with new satellites and 50 new VSat antennas to cover almost every single municipalities.

These results motivated the Ministry of Health to finance the implantation of 50 VSat antennas with a 512 Kbps velocity and also a new satellite according to the scheme below, so that connection between Telemedicine Center for the Amazon Region and municipalities could occur directly and without interference from open Internet.

Experience demonstrated that the use of low cost equipment, such as webconference can be extremely useful for this region, using for teleconsultation.³ One of the software used for these purposes is Internet Protocol Television (IPTV). It allows interview and diagnostic of patients in real time using restricted band width, basic computer, a digital camera and cyberambulatory.

The use of low cost technology and broad band connections with low transfer rate was shown to be effective, even when installed in river boats, such as a ship from Navy of Brazil, Oswaldo Cruz Hospital Ship, what is responsible for medical care of river dwelling population. This system can benefit from the contact with specialist at anytime and anywhere (Figure 8).

The association of tele-education and teleconsults, with proper authorization from the patient, allows the discussion of cases among professionals, undergraduate students and graduate students, improving the quality of teaching and allowing the patient to receive better information⁴ (Figure 9). This strategy is active since 2007 at Telemedicine Center for the Amazon Region and has shown its potential regarding assistance and education.



Figure 08 - A) Hospital Ship Osvaldo Cruz from Marinha of Brazil. B) Room for ambulatory inside NAsH Oswaldo Cruz. C) IPTV screen during tests inside NAsH Oswaldo Cruz. D) Cyberambulatory page from Amazon Center.



Figure 09 - Patient receiving assistance through teledermatology, 780 Km away from Manaus, and accompanied by undergraduate students at State University of Amazon.

INDIGENOUS HEALTH

In the midst of restructuring a health system for indigenous people, a information system was required. According to National Health Foundation (FUNASA), the evaluation of the policy for indigenous health will base itself in Information Care System for Indigenous Health (SIASI).

We must mark that the existance of an epidemiological registry will be greatly important for planning, implementation and evaluation of services and health programs, with a developing participation of indigenous people in defining its priorities.

In this context the project called Project Brazil-Canada Telehealth Collaboration - Amazon Indigenous Peoples and Remote Communities – Perspectives and Realities in the Amazon Towards - Canadian Sustainable Collaboration, has the intention to exchange information in order to establish the proper basis for the development of a collaboration program between Brazil and Canada, especially in the

Amazon region. The objective of this program is to finance, enrich, sustain, develop the actions regarding health in indigenous regions and remote communities, which are carried out by State University of Amazonas.

CONCLUSIONS

- The Amazon Center of the National Telehealth Project, inserted Telemedicine Center for the Amazon Region has achieved a third of all the municipalities in Amazonas in 2007 and 2008.
- The Telehealth Project is vital and strategic for health care in Amazonas.
- Connectivity is the most critic point in implementing these projects.
- The involvement of State and municipalities Governments is necessary for the consolidation and maintenance of the project.

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