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## Telehealth: General Aspects in Primary Care

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### 1. Introduction

The World Health Organization (WHO, 2007) is confident that the major expectations regarding public health will be met in the 21<sup>st</sup> century as a result of improved access to resources – both qualitatively and quantitatively, which will then be available to most of the world population. Building on the assumption that the technological development has yielded significant contributions to the health field, particularly by facilitating knowledge sharing and promoting care education and training either in remote and isolated areas, WHO encourages its members to adopt telehealth as a politic and strategic tool to plan and implement health actions worldwide.

Telehealth programs have reached a wide range of distinct populations through a number of forms of Information and Communication Technology (ICT) aiming at health care professionals' qualification and continuing education, as well as accessibility, cost-efficiency and quality in health care services provided in both developed and developing countries.

In 2005 the World Health Organization created the Global Observatory for eHealth aiming at both revising the use of ICT in the health care field and assessing the benefits it provides in terms of health care and quality health assistance. In 2009, a WHO report showed progress after a few years investing in telehealth-based activities (Goe, 2010).

A number of successful experiences have been reported not only by WHO, but also in the literature within the health care domain, irrespective of their focus on assistance, therapy, education or diagnosis. Given this background of health “globalization”, professionals involved with communication and information within the health care domain are now called upon to play an important role in promoting well-being, health care and happiness among patients and their relatives. Besides, their services particularly involve respecting ethical, moral and judicial standards, and assuring information privacy and confidentiality.

The WHO has adopted the following broad description for the term of telemedicine:

*“The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for*

*diagnosis, treatment and prevention of diseases and injuries, research and evaluation, and for continuing education of health care providers, all in the interest of advancing the health of individuals and the communities”.*

Four elements are germane to telemedicine:

1. Its purpose is to provide clinical support;
2. It is intended to overcome geographical barriers, connecting users who are not in the same physical location;
3. It involves the use of various types of ICT;
4. Its goal is to improve health outcomes. (Goe, 2010)

The term “telehealth” have been currently applied in the literature in reference to any health care services, ranging from prevention to treatment and rehabilitation. The term has been used in the broad sense, and given it accommodates several activities across the health care field it has been associated with the idea of interdisciplinarity.

On the other hand, the term eHealth or e-Health has been used since the year 2000, especially in publications and institutional documents. That is the case, for instance, of the major international organizations, such as WHO, the European Union (UE), the International Telecommunication Union (ITU), and the European Space Agency. Different definitions of the term eHealth suggest different functions, institutional partnerships, contexts and theoretical and expected goals.

Eysenbach (2001) for instance, defines it as:

*“e-health is an emerging field of medical informatics, referring to the organization and delivery of health services and information using the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a new way of working, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology.”*

eHealth have been used in a number of ways, changing according to the need and the tools involved. The current processes are: teleconsultation, telediagnosis, second-opinion medical advice, telesurgery, telemonitoring (telesurveillance), tele-education (continuing education), clinical simulation, electronic medical report, databank compilation and analysis, virtual image libraries, and so on.

The use of computation and telecommunication has been increasingly expanding in the public health area, involving research activities and following technology developments within both developed and developing countries.

m-Health programs have been designed for mobile electronic devices (MED), such as personal digital assistants (PADs) and mobile phones, aiming at supporting clinical decision-making, ensuring reliable data collection and promoting changes in patients’ behaviors that impact on health care promotion and management of chronic diseases in the community (Free *et al.*, 2010).

Mobile telecommunication has the advantage of covering areas that are not covered by regular Internet carriers, besides being useful for travelers, who have been already reported to send tomography images and electrocardiograms (Hernett, 2006).

The easier access to Internet has contributed to such practices involving texts, images and sounds that can be sent quite quickly. A number of devices are available, such as mobile phones, PDAs, Smartphones, e-Books, portable or ultraportable computers.

The literature reports on several m-health applications, including, but not limited to: short message service (SMS) to support the control of chronic diseases, such as diabetes, hypertension, asthma, eating disorders, and HIV treatment; SMS and PAD messages to support the control of tobaccoism, weight loss, and alcoholism. The latter have been used to collect data for research, to promote health care and to support medical education and clinical practices (Free *et al.*, 2010).

The current distance education relies on the use of multimedia, including printed materials, CDs, DVDs, televisions, web-connected computers, didactic videos and even online simulators. Teaching-learning technology has increasingly relied upon the online transmission of data, voice and image via satellite or optical fiber, and it has particularly focused on the interaction between students and the distance education centers, this interaction being mediated either by artificial intelligence or by the online communication between students, teachers and tutors (Guaranys & Castro, 1979).

Currently, a number of countries, such as Mexico, Tanzania, Nigeria, Angola and Mozambique, have adopted distance education strategies in a large scale to train their teachers and other professionals, including those in the fields of health care, agriculture, and social security, in both public and health organizations. Particularly in Brazil, a great number of technicians and financial resources have been allocated to distance education, both in public organizations and in private companies, in the last few decades. The results have pointed to several positive outcomes, but also to some difficulties and shortcomings. Most of them are related to discontinued projects, lack of coherence and continuity in public administration, and political and cultural difficulties to apply more solid criteria and scientific methodologies to assess programs and projects (Nunes, 1992).

Telemonitoring of patients with chronic diseases is also an expanding activity worldwide. It enables professionals to better control their patients and to provide both patients and their relatives with disease-specific pieces of information. The expected result is reduced morbidity and hospital admissions, and the ultimate goal is to place patients under the care of primary care teams.

Health care based on Family and Community Medicine can qualitatively improve with electronic medical management, support systems for clinical decision-making and adequate information flow from family and community doctors to other professionals in the health care systems, and vice-versa. The new technologies urge the physician to face new ethical issues regarding safety and reliability, privacy and exposure, as well as globalization of knowledge and clinical practices (Kvist & Kidd, 2010).

As globalization moves on uninterruptedly, knowledge sharing increases with the support of ICT tools. If authorities, researchers and the population itself gather efforts, telehealth may help overcome physical, economic and social barriers and thus promote equitable assistance at all levels of health care (Melo & Silva, 2008).

To be sure, telehealth improves the effectiveness of public health and primary care interventions, as it contributes to train health care professionals and improves the delivery of health services.

The WHO (2008) identifies significant changes in the health context worldwide: 1) The remarkable health advances have been meaningfully unequal; 2) the nature of health problems have been changing on a hardly predictable and unexpected pace as a result of new social, demographic and epidemiological patterns emerged with globalization, urbanization, and population ageing processes; and 3) the new health systems are also responsive to the pace of changes in the current globalization process.

Besides the existence of a number of non-regulated commercial health care services, the thin limits between the roles and accountabilities of public and private agents are not clear, and the negotiation of licenses and rights serve political interests. Exclusively commercial, non-regulated health services are usually inefficient and costing, exacerbates inequality and provide poor quality (sometimes, dangerous) health care. Health care merchandization affects reliability of health care services and the population's trust in the authorities' capacity to protect society.

Three alarming tendencies have been observed among health services worldwide: 1) Cure-oriented health systems focusing on specialized health care; 2) fragmented health services focusing on some diseases and short-term results; and 3) health systems based on non-intervention or laissez-faire policies, which leaves room for commercial health care (Eysenbach, 2001).

The World Health Organization also stresses that despite increased resources over the last ten years, several countries suffer from lack of resources in the health sector. As a result, such countries miss the opportunity to promote structural changes and build more efficient and equitable systems. Health policies have been unresponsive and from time to time establish one short-term priority or another, which shows their increasingly fragmented nature and lack of long-term perspective.

In the international context, health systems focusing on primary care have been proved to reduce costs and improve morbi-mortality irrespective of social classes. Such focus, aligned with increasing investments on health care above Gross Domestic Product (GDP) and population growth, has promoted a twofold agenda converging to primary health.

On the one hand, WHO restates values embedded in the Declaration of Alma-Ata, stressing that the protection and promotion of the health of all the people of the world demands health systems sensitive to both the challenges of an ever-changing world and the expectation of better results. This implies a need of substantial restructure and reform of the current health systems, which constitutes the grounds of the primary care renewal agenda (WHO, 2008). According to WHO, such a renewal meets the population's needs of expectations towards more socially relevant services that are not only more sensitive to the world's change, but also produce better results.

On the other hand, the liberal model has been moving the agenda to include changes in more restrict functional dimensions, especially with regards to costs: a) Selective packages focusing on service offer under the primary health care principals as prescribed by the World Bank for poor or developing countries; and b) managed care, which presupposes first contact services before patients are referred to specialists or more complex procedures as well as large use of information technologies to control costs.



Such model gained significance in the 1990s, when it influenced the structure of several health systems. New initiatives, however, were implemented later on, especially in Europe. Such changes have yielded significant improvements on primary care quality and efficiency (Giovanella & Mendonça, 2008). Some of them have led to more power and control of primary care providers over providers of other levels of care (such as coordinator and buyer) and others have enlarged the range of functions and services supplied and offered at the primary level, thus expanded the providers' role to include new curative actions, mental health community services, home care and palliative care, besides the implementation of information and communication systems, as well as continuing education.

Primary care implementation has had a deep, dynamic impact on the tendency in the health systems, as it has introduced new resources allocation modalities, changed education, the workplace and service organization, exerted pressure on the decentralization process, and enhanced popular participation (Kinfu *et al.*, 2005).

As observed in very successful experiences in some countries, health care implementation not only is important as a door for further referral, but also has the potential to serve as a key element for the strategic sustainability of health systems as it helps coordinate secondary and tertiary healthcare.

It is in this context of health systems focusing on primary care that the telehealth resources must be understood. Primary care is thus assumed as the level of care that: 1) is the gateway for the population's needs and problems and provides care to people over time; 2) provides care for any health conditions, apart from those that are very uncommon or rare; and 3) coordinates or integrates health care provided somewhere else or by third parties.

Planning telehealth to provide both permanent education and support to professional teams of primary care-oriented programs does reinforce the key role of primary care in the health systems.

Some projects implemented in such level of care, linking primary health care units with high education units in the areas of nursing, dentistry and medicine enable, primary care professionals to discuss clinical cases with professors and also to participate in videoconferences whereby they can discuss the most relevant care problems at this level of care.

The introduction of telehealth grants primary care professionals with the access to specialists to discuss clinical case in order to either improve the services they provide to a given patient or to opt for further referral to a specialist. In other words, the professionals have their capacity expanded and become more qualified for the service they provide.

Projects involving distance-learning webconferences are innovative in content and technology, but most importantly they offer a special learning dynamics in which the feeling of belonging to a virtual community does play an important role for the learners. Learning competences therefore builds on the introduction of group-oriented efficient and innovative practices. It is the group that plays the role of interlocutor in the webconferences, it is the group that builds its own identity in the community of practice and it is the group that becomes strong through mechanisms of evaluation and acceptance of new care practices.

The feeling of belonging to a virtual community where peer can share experiences and ways of work set the context for the skills to be learnt by the health teams, which is important in a process of changing attitudes and accountabilities regarding health care.

The fact that webconferences are based on actual care problems faced by health professionals implies an actual process of experience sharing, not only between professors and professionals, but also among the professionals themselves.

Differently from managed care, which focuses on real-time work to put new health practices in place (Mehry, 2011), telehealth projects open up a range of new possibilities to support clinical decision making both at the primary level of care and across the different levels. The result is a more qualified primary level of care along with increased control of referral to the next level, as health care teams have already carried out a number of preliminary analyses and also taken the necessary measures for which they are accountable.

The logic is turned upside down: It is the secondary and tertiary levels of care that help to keep patients at the primary level, and the decentralized referral mechanism ensures that most of the work is done at the primary level. The introduction of telehealth resources:

1. Optimizes the primary level role in coordinating how health care is provided to patients. As the discussion of actual and specific clinical cases inform primary care professionals they have the necessary knowledge to only make referral of patients that do need health care at other levels. This introduces a new way to provide health services: professional share their diagnoses and assessments before making referral of patients to other levels of care, which is a key procedure to develop more effective and integrated health care networks;
2. Enhances the primary level of care, as it enlarges the scope of this level: Primary care professionals are empowered to follow up patients even in more complex cases, as they share knowledge and information with specialists instead of simply referring patients to them;
3. Enables follow up under different circumstances: even when patients are referred, the primary care professionals have full understanding of their situation and take the first measures to treat a given patient. Knowledge sharing is a key step to bring the different levels of care together;
4. provides continuing education, so primary care professionals can learn from actual cases and be empowered to provide more complex health care treatments with the help of professionals working at the secondary and tertiary levels.

In practice, introducing telehealth resources contribute to place primary health care as the foundation that supports and determines the activities at all levels of care within the health systems. It is healthcare itself the foundation that organizes and rationalizes all the resources (both basic and specialized) oriented to promote, maintain and improve health (Starfield, 2002).

In the broad context of primary care renewal to cope with the new challenges of an ever-changing world, the introduction of telehealth resources serves to develop a more rational process of both cutting and allocating costs without either affecting quality or controlling physicians' performance. On the contrary, knowledge sharing is a key tool to introduce new elements in health care services that are more likely to generate successful results and avoid unnecessary costs.

It does interfere in the health and medical system as whole, but it is highly expected to generate positive impacts on how health care services are delivered, as it draws on primary care and people networking.

By identifying the necessary primary care renewals, reforms are supposed, as WHO stresses, to aim at universal health coverage that ensure equality, social justice, end of social exclusion, and social protection to health. Such renewals should embrace three perspectives: 1) Coverage expansion, i.e. to expand the parcel of the population that enjoys social protection to health; 2) Coverage enhancement, i.e. to expand the range of health services in order to provide for the population's needs efficiently and meet demands and expectations, but also taking into account the resources the society is both willing and capable to afford; 3) Coverage level, i.e. to eliminate direct payment for the services.

Taking such perspectives into account, telehealth resources can contribute to at least two of them, as telehealth is a potential tool to expand and enhance coverage, especially in those areas for which no specialists are available. Furthermore, the introduction of telehealth resources in patient's homes especially to monitor such chronic pathologies as hypertension and diabetes has generated new care modalities to face the impact of demographic transition, which makes the co-morbidity process more complex.

Therefore, in the light of challenges in the way to provide universal and equitable coverage as preconized by WHO, telehealth services is expected to contribute as follows: 1) To gradually create primary care networks to remedy the lack of services available; 2) To overcome the isolation of scattered populations; 3) To address inequality issues related to health; and 4) To open avenues for civil societies' participation and empowerment.

The use of telehealth resources can also contribute in the process of health reforms aiming at shifting from the conventional health system to a primary care-oriented health system that is more socially pertinent and responsive to current changes in the world. Several international experiences have been successful in allying information technology with distance health services via telehealth as the patients' first contact with the health systems.

Telehealth can also help and integrate actions aiming at policy reforms targeting a series of policies to face challenges posed by urbanization, climatic change, epidemiological profiles and social stratification. In other words, telehealth resources can be a key tool for the society, especially when it integrates several healthcare dimensions within the health systems.

## 2. Key benefits of the use of telehealth

Telehealth appears as an important tool for the actions recommended for health promotion to be implemented (Norris, 2002; Wooton *et al.*, 2005; Stroetmann, 2010). Nonetheless, there is a lack of robust data on the clinical effectiveness, the risks of the implementation of the telehealth technologies and their cost-effectiveness (Ekeland *et al.*, 2010; Black, 2011).

The following main actions and products that can be achieved to improve primary health care (Table 1) are based mainly in preliminary pilot project results, opinions and prediction.



Actions	Benefits for primary care
Telemonitoring of chronic illnesses	Better disease control; Reduction of comorbidity and mortality; Improved quality of life; Reduction in hospital admissions and demand for emergency care services; Reduced absenteeism; Reduction of public expenditure on hospitalization and sequels.
Second opinion via teleconsultation	Health professionals retention in rural areas; Improved patient assistance; Better health care professional/ patient ratio; Reduced patient traveling; Opportunity to share knowledge; Access to specialists improving clinical decision making; Reduction of waiting times for consultation with specialists.
Videoconferencing	In service training of professionals; Opportunity to share doubts and decisions.
eLearning	Training with less traveling; Social Interaction; Shared space of knowledge construction and development; Constructive and critical support through tutoring.

Table 1. Telehealth tools and potential products in primary health care

### 3. The Brazilian experience

The reorganization of the health system in Brazil, including the focus on primary health care, has been recent. The implementation has relied upon professionals who have traditionally had a conventional educational background, with courses structured according to a highly specialized, curative, individual and hospital centered approach. The challenge of incorporating telehealth resources in the Brazilian public system (SUS – *Sistema Único de Saúde* in Portuguese) is linked to the objective of strengthening the public model already established. It also had the intention of reinforcing the role of primary health care in a context where professionals are still not adequately trained, both from the point of view of dealing with clinical issues at this level of attention and of promoting health.

The National Telehealth Program currently consists of 1,011 telehealth centers connected to 10 universities and spread over 789 municipalities, benefiting some 2,796 health family teams. One of the dimensions of this project is based on the webconferences. In a State of Minas Gerais webconferences addressing family health teams within member municipalities take place every 15 days and involve classes and talks given by professionals in the areas of medicine, nursing and dentistry. A multicast network transmits the talks simultaneously to multiple Primary Health Care Units in the municipalities. A multipoint videoconference software package enables telecommunication resources comprising images, data and voice

as well as shared electronic medical records. The virtual learning environment reproduces a classroom simultaneously offering audio, video, data and graphic resources in a group-friendly learning-oriented environment.

The Telehealth Center of Medicine School at Federal University of Minas Gerais (NUTEL) in partnership with the programs BHtelehealth and the Brazilian National Telehealth Program has developed activities involving teleconsultation, teleassistance, videoconference and distance education, and it is currently designing projects to telemonitor diabetic and hypertensive patients and follow up asthmatic patients. The following education centers participate in NUTEL activities: School of Medicine, School of Dentistry, School of Nursing, and Laboratory of Scientific Computation of the Federal University of Minas Gerais (UFMG – *Universidade Federal de Minas Gerais* in Portuguese)

NUTEL has its own team to produce instructional materials, including videos, animations, 2D and 3D modeling, and this team has contributed to design distance courses and instructional materials to be published by the Brazilian Ministry of Health and several Municipality Health Departments. The material has supported training programs focusing on health care projects and also educational programs focusing the community, particularly aiming at the control and prevention of epidemics and infectious diseases, such as H1N1 and Dengue. Part of the materials is also distributed among private corporations. The distance education courses offered by NUTEL include: Urgency and Emergency, Electrocardiogram Interpretation, Arterial Hypertension, Dengue, Chagas' Disease, Diabetes, Arterial Hypertension during Pregnancy, Traumas. NUTEL is also developing courses on Childhood Asthma and Telehealth for Policy Makers of Latin American countries involved in an Inter-American Development Bank (IDB)-funded project, "Regional Public Policies on Telehealth in Latin America and the Caribbean".

Distance education is an important educational strategy that responds to the needs of a large number of professionals that are not able or willing to move from one place to another. It is more effective than several other teaching modalities that exclusively demand student's physical presence, irrespective of the number of students attending the courses. It meets current demands of universal education both efficiently and qualitatively, representing an adequate source of knowledge update in a world in ongoing change. It is an efficient solution to a number of barriers that primary health care professionals may face when it comes to pursuing continuing education, including limited budgets, schedules, on-the-job learning opportunities, access to information and offer of services by public institutions (Mathauer & Imhoff, 2006). Furthermore, continuing education is crucial for physicians living and working in remote areas, as it increases self-confidence and reduces professional isolation, which are key elements to attach them to these unprivileged areas.

NUTEL currently offers online and offline teleconsultation systems with a team of professionals on duty providing services on internal medicine, pediatrics, gynecology, obstetrics, dermatology, dentistry, nursing, physiotherapy, pharmacy, nutrition and clinical pathology, besides access to over 46 medical specialists. Professionals working in family health teams are allowed to access the system, whereby they can describe a particular clinical case on the basis of either a real situation or a context-free question. They can also attach images and other files that assumedly help understand the case (diagnosis,

propaedeutic, and therapy). The teleconsultants analyze every request and reply them according to a system-generated priority list.

Every piece of information is protected through a number of methods, including cryptography, message integrity, user authentication, and safe backup policy. Every user has a nontransferable personal login and password that expires within a given limit of time.

Videoconferences and webconferences have taken place both domestically and internationally, focusing on primary health care as promoted by UFMG School of Nursing, School of Dentistry and School of Medicine. Some of them have been provided in partnership with BHTelehealth Program and the National Telehealth Program.

In 2003, the city of Belo Horizonte, known for its innovation and success in the organization of the Brazilian National Health System (SUS), prepared a project to incorporate ICT. The process (BHTelehealth project) reflected the objective of providing the assistance model, centered on primary health care, the necessary tools for strengthening the quality of attention. In addition, it sought to structure the educational training of the professionals by using innovative distance learning resources such as interactive environments, organic modeling in 3D, animations and videos. It sought to create a process of permanent education for its professionals and staff that would include the use of interactive resources, 3D modeling and animations in distance learning courses, teleconsultations and videoconferences.

The National Telehealth Program assigned an expert group to analyze interactivity solutions available in the market and then point out the pros and cons of each software package. Their report provided enough information for each center to opt for software package that would be most suitable for their needs. The Telehealth Center at the UFMG School of Medicine adopts the copyright packages Sametime® and Adobe Connect®.

One of the challenges posed by the webconferences is the design of a curriculum that do meet the actual health demand detected by the health family teams. To face this challenge, NUTEL has defined the curriculum topics during the webconferences that promotes with the municipalities in the State of Minas Gerais in the beginning of every semester. Table 2 shows the number of participants attending the webconferences in the State of Minas Gerais from 2008 through 2010, as provided by the very webconference software package. This is a way to ensure that the topics approached in the webconferences address the problems identified by the technical coordinators and the health professionals themselves. Among the most frequent topics are complex problems identified in the delivery of primary care services or in unexpected epidemiologic situations.

Area/Year	2008	2009	2010
Medicine	590	513	594
Nursing	1149	676	926
Dentistry	1217	605	904
<b>Total</b>	<b>2956</b>	<b>1794</b>	<b>2424</b>

Source: Nutel/UFMG.

Table 2. Webconference participants of the National Telehealth Program, 2008 - 2010.

To be sure, the major objective of a webconference on primary health care is to ensure professionals' learning on the basis of the very problems they identify in the course of their professional activities.

Distance education is still an incipient activity in Brazil, but some initiatives have opened doors to turn it into a large-scale public policy in the country. The main ongoing initiatives aim at improving any given dimension of the primary health care. They are carried out in the framework of the National Telehealth Program and the Open University/Brazilian Health System (UNA/SUS in Portuguese), which shows the Ministry of Health's concern with framing primary care as the organization and coordination dimension of the health care services delivered to the population. The recent institutional status given to UNA/SUS in late 2010 is a landmark that will boost the design and implementation of health-oriented distance learning courses, as UNA/SUS is now assigned to plan and coordinate the leading initiatives in the area. On the other hand, the initiatives implemented by the National Telehealth Program has already helped a number of Brazilian states experience the potential of new teaching technologies, as particularly observed in regard to the webconferences and the courses, the latter also aggregating market power given the use of simulators, organic modeling and animations. This process focusing on training professors from the major public universities and health professionals in Brazil has helped introduce the potentials of this technology in the health field.

The webconferences and teleconsultations have been important activities to both training family health teams and to improve the health care services delivered to the population without the health professionals' need to commute in order to receive formal education.

The referral of patients from primary health care professionals to specialists is considerably difficult in the national health systems, as they have no time slots in their schedules. Patients' commuting is also difficult, because of intense traffic flow in the Brazilian roads, inadequate road maintenance, high costs and large distances within the Brazilian territory. Besides the delivery of better health care services, teleconsultations are a key tool to spread knowledge among professionals and reduce isolation feelings among those living and working in remote and rural areas. Patients have reported satisfaction when they get to know specialist and professors are discussing their cases, and this reinforces their empathy and ties with the family health teams.

The telemonitoring of hypertensive and diabetic patients is an incipient project within the National Telehealth Program. The idea is to use the existing telehealth structure to monitor and follow up glucose and arterial pressure in patients in serious condition. This patients will be monitored by their health family teams and a specialist particularly gathered for this purpose at UFMG School of Medicine and School of Nursing. This will eventually result in teleconsultations scheduled in advance, continuous networking among members of the health family teams, and implementation of learning courses based on reliable simulators and experimented levels of difficulty. Simultaneously, training courses, simulators and videoconferences will provide an in-depth approach to the process preconized by the Brazilian Ministry of Health for the monitoring of these pathologies by the health family teams. All the municipalities will participate in this training process, and the 50 primary health units selected for the monitoring activities will also have their activities implemented in order to provide such follow up accordingly. By the end of two years, it is expected to

have a very well structured process to monitor hypertensive and diabetic patients within the primary care framework. This will be based on the telehealth strategy, which will possibly go through an in-depth assessment.

#### 4. Future of telehealth in primary care

Currently primary care is internationally considered the basis for a new model of user-citizen centered health care systems. In European countries, primary care refers generally to outpatient services first with an integrated system of universal access. At a conference in Alma-Ata, primary care was seen as essential health care based on practical, scientifically sound and socially acceptable methods and technology, the first component of an ongoing process of health care, access to which should be fully guaranteed for the entire population (Giovanella & Mendonça, 2008).

The Bangkok Charter for Health Promotion in a Globalized World (2005), identifies actions, commitments and pledges required to address the determinants of health in a globalized world through health promotion. Emphasizes that globalization opens up new opportunities for cooperation to improve health and reduce transnational health risks. These new opportunities include:

- optimization of information and communication technology;
- improvement of governance processes and sharing of experiences.

The future of information and communication technology in primary care is beneficial and should be present in the medical and other health professionals, prescription, guidelines and telemonitoring. The electronic health record (HER) and teleconsultation are already a reality. Also the support for the diagnosis and therapeutic decision making with the help of mobile phones, through the consultation of electronic documents, allowing them access to some protocols and scores, doses and drug prescriptions. The telemonitoring is possible with the use of mobile equipment (*mHealth*) or through home computers with the possibility of access to tests and verification of the adherence to treatment (Speedie *et al.*, 2008; Stroetmann, 2010).

#### 5. Conclusion

Nowadays health services management can use telehealth resources making possible the integration of services and opening up new possibilities for training professionals in remote areas. As a result health professionals feel their work is more valued, increasing the opportunities for them to remain in the remote regions away from large urban centers. Also, services provided to the population have a significant improvement in quality, since telehealth technology allows health professionals to have an increased online and offline interaction with other centers.

The use of telehealth resources in primary care is in expansion, with varied application levels that include activities ranging from tele-education to teleconsultation, second opinion telemonitoring and telecare. Since the education process happens at the health unit, it implies in efforts optimization and resources rationalization, once professionals do not have to move from his/her workplace.



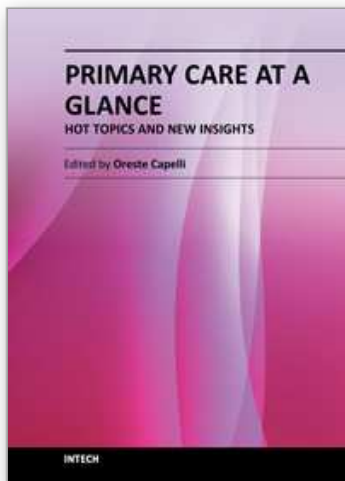
Considering the assistance aspects for municipalities, the possibility of health professionals discussing clinical cases with specialists increases the effectiveness and adds quality to the primary care. Objective and subjective evaluations of the benefits that come with this data is a complex process, which is under development in the program. Concerning the second opinion, its usage contributes to structure the assistance models linked with different complexity levels. The use of telehealth resources on these remote areas introduces a change in the working process.

## 6. References

- Black A.D., Car J., Pagliari C., Anandan C., Cresswell K., Bokun T., McKinstry B., Procter R., Majeed A. & Sheikh A. 2011. The impact of ehealth on the quality and safety of health care: a systematic overview. *PLoS Medicine*, Vo.8, No.1:e1000387. Retrieved from <http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1000387>
- Ekeland A.G., Bowes A. & Flottrop S. 2010. *International Journal on Medical Informatics* Effectiveness of telemedicine: a systematic review of reviews, Vo.79, pp.736-771, ISSN 1386-5056.
- Eysenbach G. 2001;What is e-health? *Journal of Medical Internet Research*, Vo. 3, No.2:e20. Retrieved from <http://www.jmir.org/2001/2/e20/>
- Free C., Phillips G., Felix L., Galli L., Patel V. & Edwards P. 2010. *BMC Research Notes*, Vo. 3:250. Access Feb. 26. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2976743/pdf/1756-0500-3-250.pdf>
- Giovanella L.& Mendonça M.H.M. 2008. Atenção primária em saúde. In: *Políticas e sistemas de saúde no Brasil*. Giovanella L., Escorel S., Lobato L.V.C., Noronha J.C., Carvalho A.I. pp.575-625, Editora Vera Cruz, ISBN 978-85-7541-157-5, Rio de Janeiro.
- Guaranys L.R. & Castro C.M. 1979. O ensino por correspondência: uma estratégia de desenvolvimento educacional no Brasil. *IPEA*, ISSN 167-6079.
- Hernett B. Telemedicine systems and telecommunications. 2006. In: *Introduction to Telemedicine*. Wootton R., Craig J. & Patterson V. pp. 15-34. Royal of Medicine Press Ltd., ISBN 1853156779, London.
- Kinfu Y., Dal Poz M.R., Mercer H. & Evans D.B. 2009. The health worker shortage in Africa: are enough physicians and nurses being trained? *Bulletin of World Health Organization*,Vo. 87, pp. 225-230. ISSN 0042-9686.
- Kvist M. & Kidd M. 2010. O papel das novas tecnologias da informação e comunicação na atenção primária. In: *Atenção Primária conduzindo as redes de atenção à saúde - Reforma organizacional na atenção primária européia*. Saltman R.B., Rico A., Boerma W.G.W. pp. 317-338, Open university press. ISBN 13978033521365 8, England.
- Mathauer I. & Imhoff I. 2006. Health worker motivation in Africa: the role of non-financial incentives and human resource management tools. *Human Resource for Health*, Vo. 4, pp. 24-41, ISSN 14784491.
- Melo M.C.B. & Silva E.M.S. 2006. Aspectos conceituais em telessaúde. In: *Telessaúde*, Santos A.F., Souza C., Alves H.J., Santos S.F, pp. 17-31, Ed. UFMG, Belo Horizonte, ISBN 8570415826.
- Merhy E.E. 2001. E daí surge o PSF como uma continuidade e um aperfeiçoamento do PACS. *Interface Comunicação, saúde e educação*, Vo.9, pp.147-149, ISSN 1414-3283.

- Nunes I.B. 1992. Educação à Distância e o Mundo do Trabalho. *Tecnologia Educacional*. Vol.21, No. 107, jul/ago, pp. 73-74, ISSN 0102-5503.
- Norris A.C. 2002. *Essentials of telemedicine and telecare*. John Wiley & Sons Ltda, ISBN 0470851813, England.
- Speedie S.M., Ferguson S., Sanders J. & Doarn C.R. 2008. Telehealth: the promise of the new care delivery models. *Telemedicine and e-Health*, Vo.14, No.9, pp.964-967, ISSN 15305627.
- Starfield B. 2002. *Atenção primária: equilíbrio entre necessidade de saúde, serviços e tecnologia*. Brasília: UNESCO/Ministério da Saúde. Retrieved from [http://bvsmms.saude.gov.br/bvs/publicacoes/atencao\\_primaria\\_p1.pdf](http://bvsmms.saude.gov.br/bvs/publicacoes/atencao_primaria_p1.pdf)
- Stroetmann K.A., Kubitschke L., Robinson S., Stroetmann V., Cullen K. & McDaid D. 2010, How can telehealth help in the provision of integrated care? *World Health Organization*, Copenhagen. Retrieved from [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0011/120998/E94265.pdf](http://www.euro.who.int/__data/assets/pdf_file/0011/120998/E94265.pdf)
- Wootton R., Craig J. & Paterson V. 2006. *Introduction to telemedicine*. 2<sup>nd</sup> ed. Royal Society of Medicine Press Ltd, ISBN 1853156779. London, UK.
- World Health Organization. The Bangkok Charter for Health Promotion in a Globalized World, Bangkok, Thailand, 2005. ([http://www.who.int/healthpromotion/conferences/6gchp/hpr\\_050829\\_%20BCHP.pdf](http://www.who.int/healthpromotion/conferences/6gchp/hpr_050829_%20BCHP.pdf) -accessed 9 november 2011).
- World Health Organization. Department of essential health technologies. Information technology in support of health care. Geneva, [s.d.]. Access Sept. 07 2007. Available from: < [www.who.int/entity/eht/en/InformationTech.pdf](http://www.who.int/entity/eht/en/InformationTech.pdf) >
- World Health Organization. The World Health Report 2008 - primary Health Care. Access Nov. 11 2011. Available from: <http://www.who.int/whr/2008/en/index.html>
- World Health Organization. Global Observatory for eHealth Series, 2. Telemedicine: opportunities and developments in Member States: report on the second global survey on eHealth, 2010. p.96.

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"Both among scientists and clinical practitioners, some find it easier to rely upon trivial explanations, while others never stop looking for answers". With these surprising words, Augusto Murri, an Italian master in clinical medicine, reminds us that medical practice should be a continuous journey towards knowledge and the quality of care. The book brings together contributions by over 50 authors from many countries, all around the world, from Europe to Africa, from Asia to Australia, from North to South America. Different cultures are presented together, from those with advanced technologies to those of intangible spirituality, but they are all connected by five professional attributes, that in the 1978 the Institute of Medicine (IOM)<sup>1</sup> stated as essentials of practicing good Primary Care: accessibility, comprehensiveness, coordination, continuity and accountability. The content of the book is organized according to these 5 attributes, to give the reader an international overview of hot topics and new insights in Primary Care, all around the world.

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