

Telemedicine in Bulgaria



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Abstract

This article is focused on the Bulgarian trends and initiatives in development and application of telemedical applications and the importance of evidence-based telemedicine. The paper presents separate modules, including education in telemedicine, where in Bulgaria telemedical systems are introduced, the healthcare system in Bulgaria itself, journals and conferences, and, finally, the author's experience in telemedical solutions and implementations.

Key words: Telemedicine; Telehealth; Medical Informatics; Delivery of Health Care; Information Technology.

Resumen

Telemedicina en Bulgaria

Este artículo trata de las tendencias e iniciativas búlgaras en el desarrollo y aplicación de la telemedicina y la importancia de la telemedicina basada en evidencias. El trabajo presenta módulos separados, incluyendo educación en telemedicina, dónde se introducen los sistemas de telemedicina en Bulgaria, el sistema sanitario en Bulgaria, periódicos y congresos, y por último, la experiencia de los autores en las soluciones e implantación de la telemedicina.

Palabras clave: Telemedicina; Telesalud; Informática Médica; Prestación de Atención de Salud; Tecnología de la Información.

Resumo

Telemedicina em Bulgária

Este artigo trata das tendências e iniciativas da Bulgária no desenvolvimento e aplicação de telemedicina e da importância da telemedicina baseada em evidências. Este artigo apresenta módulos separados, incluindo educação em telemedicina, onde se introduzem os sistemas de telemedicina na Bulgária, o sistema de saúde na Bulgária, periódicos e congressos, e por último, a experiência dos autores em soluções e implementações de telemedicina.

Palavras-chave: Telessaúde. Informática Médica; Cuidados de Saúde; Tecnologia da Informação.

INTRODUCTION

In Bulgaria, a small country with population about 7.000.000 people, located mainly in the capital Sofia, and in 2.000.000 several other big cities, it is absolutely necessary to perform and ensure patients in remote villages with a kind of constant and immediate medical services. Bulgaria has two mountain-chains that are hard to reach and travel regions with lots of small towns, with big advance in the population age and lack of young specialists to perform qualitative healthcare services.

EDUCATION IN TELEMEDICINE IN BULGARIA

Telemedicine and e-Health are not popular and widely spread specialties in Bulgaria. In fact, the only place that has bachelors and masters degrees in Information and Communication Technologies (ICT) in medicine is New Bulgarian University, Department of Biomedical Sciences.

For what kind of users and experts is offered that education in telemedicine?

1. For physicians as participants in diagnostic, consulting and all other kinds of specialized tasks (like re-

- porting, analysis, planning and documentation);
- 2. Nurses/bachelors in healthcare services who can perform a large part of their tasks indirectly - especially in the form of telepresence, teleassistance, regulation schemes and medicated control of patient's behavior;
- 3. For medical and other professionals in training and retraining in different time regimes and on different occasions;
- 4. For patients/health insurance experts, as promoters of self-control procedures.

PRACTICE : WHERE SEPARATE SYSTEMS ARE INTRODUCED

In Bulgarian medical hospitals, clinics and other private institutions there are particular projects and implementations, which usually are not sponsored by the Government. There is Leonardo Da Vinci in Pleven City, several solutions for the Military Academy and Medical Hospital in Sofia, different developments in separate wards and departments, which often even are not popularized and published in the press and special journals.

HEALTHCARE SYSTEM IN BULGARIA

The main stakeholders in Bulgarian health system are the Parliament, the Ministry of Health, the National Health Insurance Fund and the Higher Medical Council. A num-



Figure 01 - New Bulgarian University web site. (www.nbu.bg)

ber of other ministries own, manage and finance their own health care facilities, including the Ministry of Defense, the Ministry of Internal Affairs and the Ministry of Transport.

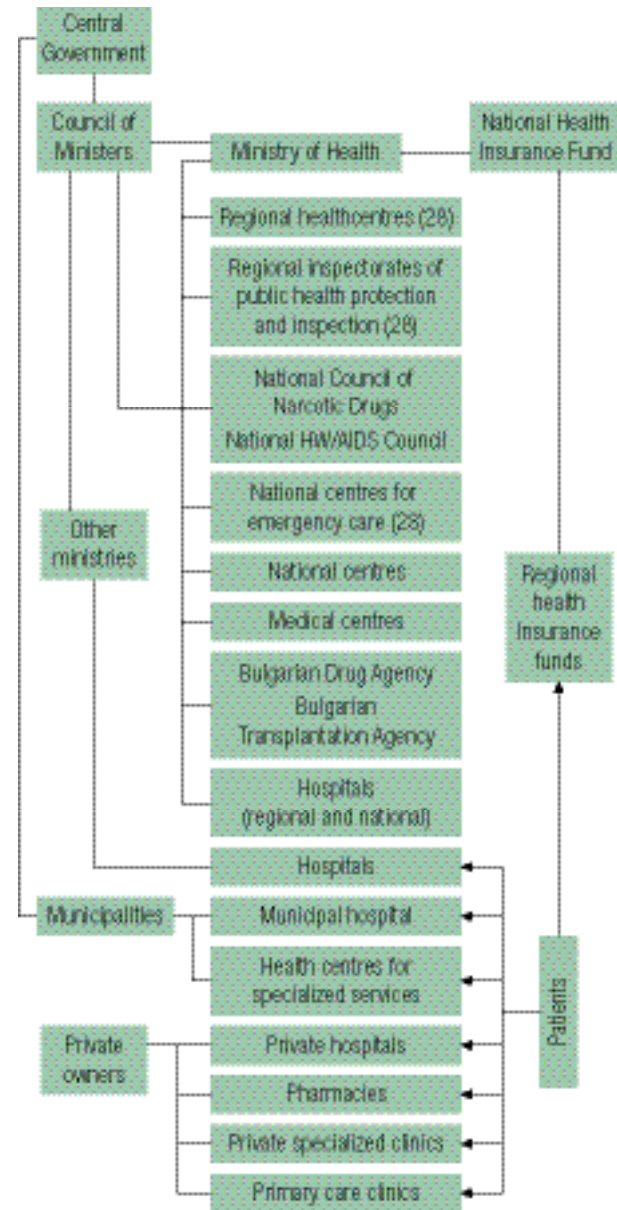


Figure 02 - Model of Bulgarian healthcare system.

Private practice has expanded significantly, now including dental practices, pharmacies, surgeries, laboratories and outpatient clinics and polyclinics.

There have been advances in overall investment for the IT sector in Bulgaria as well as for IT in the healthcare system. In 2008, Information and Communication Tech-

nology expenditure accounted for 0.77% of GDP and there were nine personal computers (PCs) per 1000 inhabitants in 2007, compared to seven in 2005.⁴ Use of the Internet is also increasing. A recent survey, conducted by the Alpha Research Agency, found that 2% of adult Bulgarians used the Internet in 2007. IT enjoys an ever-expanding application in outpatient care medical centers and in hospitals. Thanks to a financial donation from the World Bank, every GP now has a PC workstation and all PCs report are in a digitalized format.

According to the “road map” setting for the particulars of the coming incorporation of a Diagnosis-Related Group (DRG) system within the reporting processes of hospitals, and with the support of USAID and e-Health Information Systems, a pilot project with hospital beneficiaries was developed and implemented. The National Center for Health Informatics is also currently working on a project related to the introduction of information standards within the healthcare system under which, in 2007–2009, all regional health care centers were updated with modern IT equipment.

The Health Card is one of the key technologies currently being developed and introduced in Bulgaria for health sector optimization, for more efficient transactions between healthcare institutions, more secure, flexible and transparent exchange of information, standardization of services and activities. This ensures future interoperability with other European countries and health systems. So far, there is no exact information about the dates for the launch of the system.

JOURNALS

In Bulgarian publishing sphere there are several journals that often publish issues in medical informatics and telemedicine:

1. Social Medicine Journal: A journal for informatics, health management, social epidemiology, economics, health law (a quarterly Association Scientific Society of Social Medicine, Informatics and Health Management);
2. Military Medicine Journal, ISSN: 1312-2746;
3. Healthcare Management, ISSN 1311-9982 Edition of the Faculty of Public Health - MU Sofia;
4. Health Economics and Management Journal, ISSN 1311-9729;
5. Medical Review Journal, ISSN 1312-2193;

CONFERENCES, MEETINGS, SOCIETIES

There are several annual meetings, performed by the main players in Bulgarian medical society:

1. National Conference “Connectivity in the healthcare system. Building the ICT infrastructure. Improving patient care through optimized access to personal data. Improved prophylaxis and prevention through the ICT sector. Telemedicine. Security”;
2. Annual National Conference on ICT for Health;
3. International Conference “Enforcement of standards in eHealth. Integration of information systems interoperability, Privacy in the eHealth”;
4. Workshop on eHealth in Bulgaria;
5. National Conference on Hospital Information Systems and Connectivity.

SPECIALIZED FOUNDATIONS

Two basic foundations develop strategies and working documents in the field of eHealth:

1. EHealth Foundation BULGARIA (<http://www.ehealth-bg.org>);
2. Bulgarian Society of Social Medicine, Health Management and Informatics (<http://www.medunion-bg.org/drujestva.aspx>).

OUR EXPERIENCE

Our software solution is implemented in 2 remote hospitals: Aeroclinic in Sofia and Municipal Hospital in Svoge City that is about 50 km. far from Sofia. (Figure 03)



Figure 03 - Entrance screen.

For the Bulgarian healthcare system, as every other, there are strict requirements for healthcare delivery services and payment organization. For the realization of our solution, were pointed the following tasks:

- development of software for telemedicine purposes, where the user should identify his/her every single step with digital signature (requirement from Ministry of Health);
- development of web portal for popularization of the project;
- assurance of the required technologies:
 - Laptop with camera, microphone and audio system for every General Practitioner (GP) in the separate municipalities;
 - Digital stethoscope and digital ECG apparatus for distance transmission of data;
 - Specialized videoconference software for communication between the users;
 - Professional hardware for videoconference rooms.

The software solution, divided into three separate modules (doctors, operators and administrator), has additional functions for each profile, because of the specific functionality and duties.

After starting a request for consultation there are the following types of fields:

- Paraclinic examinations – Identical with the paper original;
- Blood tests;
- Patomorphologic;
- Urine tests;
- Image examinations;
- ECG, X-ray, Echocardiography, Velotest, Holter, Scanner, Mamography and Others.

These examinations allow upload of unlimited number of images, text description fields. Both the consulting GP and responding experts, are able to zoom images to original size.

User parameters that the system register are name, action, host, ip address, day, month, year, hour, minutes and seconds. It also allows filtering of any of the above mentioned parameters, Excel export of the references, chronology control.

The Administrator performs a connection between users and software developers, which is realized as an e-mail box in the platform with standard parameters.

The system allows filtering of any of the above mentioned parameters, Word & Excel export of the references,

chronology control, and graphical representations in bars. Statistical basis is organized in 69 different sections. In order to prove the usability and benefits from telemedical investments, there are two statistics about percentage of application for a medical expert and for a hospital.

1. *Doctor statistics and Hospital statistics*: from date to date; number of required consultations and number of accomplished consultations.
2. *References with export to Word, Excel and with graphical visualization*:
 - Number of consultations per period: filtering through starting and ending date, level of consultation;
 - Number of consultations with result “Hospitalization”: filtering through starting and ending date, level of consultation;
 - Percentage distribution according specialists: filtering through starting and ending date, level of consultation and specialty;
 - Number of consultations with second consultation - filtering through starting and ending date, level of consultation;
 - Percentage distribution of correspondence between working and final diagnoses - filtering through starting and ending date, level of consultation;
 - Percentage distribution of final diagnoses according disease types - filtering through starting and ending date, level of consultation.
3. One of the most important statistics is actually the chronology of the system and control of each activity of every user.

The system checks every 30 seconds about newly arrived requests for consultations, and ensures sound and visual signalization to attract the expert’s attention.

The operator’s module is the main coordinator in the system, where the operator manages the expeditiousness of the process of giving consultation, and in case delay of 24 hours, the system allows redirecting the form according to the available specialists. In case of few requirements for the same specific condition, consultations arrive at the same moment, the system distributes through the available specialists in the corresponding specialty.

We have accomplished 150 consultations and 2.000 registered activities. Our purposes are to adopt the model and to implement in five municipalities at first and afterwards in every municipality on Bulgarian territory.

For what types of patients is intended this healthcare method?

1. For patients with “no time”, particularly active and financially supported to seek maximum quality of service they want to vote and to participate in making “the second / other opinion”.
2. For patients with “no option”, single adults and people with a bunch of diseases that are physically incapacitated to contact his/her doctor.
3. For patients with “no contact conditions”, those who can not receive direct medical services due to any unique affecting circumstances and large contingents of people (from living in remote locations to space flight and military operations).
4. For patients like “I have the right of consultation”, prompted by the Constitution, to regulate access to health care with appropriate quality and prices, which should be clearly defined by the authors and affordable for consumers.

CONCLUSION

The aim of this project is to investigate and explore each factor that have an influence over the solution, to explore the healthcare system in Bulgaria in the necessary depth thus to eliminate possible shortages. Planned teleconsultations in the standard software form, accompanied by with videoconference dialog with parallel transmission of specific medical data and images, represent a highly effective diagnostic tool. Telemedical consultations bring about less mistakes and better care through reducing information misunderstandings.

The user’s opinion up to the current moment of 24 months experience is high approval and satisfaction.

It’s not too much of a stretch of the imagination to realize that telemedicine will soon be just another way to see a health professional, just as seeing friends and family while talking to them on the phone is becoming commonplace. This system would monitor daily health status and automatically notify a health professional if we become ill.

Fifteen or twenty years ago, Bulgaria had no idea it would rely heavily on faxes, answering machines and e-mail, tools which are now low-tech and taken for granted. In 2010, telemedicine still has not reached its potential in countries like Bulgaria. With this mass project its planned to implement and investigate every single positive and negative factor of the solution, to explore the system and to eliminate possible personnel shortages.

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