

# PERSPECTIVES TRENDS OF MEDICINE OF THE XXI CENTURY

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**Abstract:** *Telemedicine started to gain ground in XXI century, under the form of medical consultation at distance, distant medical assistance, distant diagnosis etc. The aim of the Romanian doctors is to become part of an international circuit which will allow them to have access at the latest information and top medical technology. The Romanian Association for Telemedicine and Health Space Applications was established in this respect. The robotic surgery started to have applications in telemedicine, as well.*

**Keywords:** *telemedicine, robotics, telediagnosis, teleradiology*

**Rezumat:** *În secolul XXI se impune tot mai mult Telemedicina: consultație clinică la distanță, teleasistență medicală, telediagnostic etc. Scopul medicilor români este să se insereze într-un circuit internațional care să le permită accesul la informațiile și tehnicile medicale de vârf. S-a constituit Asociația Română de Telemedicină și Aplicații Spațiale pentru Sănătate. Chirurgia robotică are, de asemenea, aplicații în telemedicină.*

**Cuvinte cheie:** *Telemedicină, Robotică, Telediagnostic, Teleradiologie.*

Telemedicine has started to gain more and more ground.

Definition:

- General – Telecommunication applications in providing medical assistance in the isolated areas at a large distance from the medical units;
- Nasa – Integrating the medical assistance technology, of the information, telecommunication and of the interface between humans and machines, within a view to provide the medical care for the people in the space.
- Bashshur et al. – the use of the modern informational technology especially of the audio-video interactive ways of communications, of computers and telemetry for the supply of the health services in isolated areas or in order to facilitate the informational exchange between the physician who ensures the primary care and the specialized physician at a distance.

Although, the term of telemedicine is used today especially in order to name the “clinical consultation at a distance” – what seems to be a vanguardist subject, without immediate results, turned to be an important support for the majority of the health services, in the last years. Thus, telemedicine created the necessary premises for a direct relation between the patient, general practitioners and specialized physicians of different regions of a country or of the world. This gives the doctors the possibility to exchange opinions in order to establish a diagnosis or a possible treatment that should be administered. They will have access to the electronic medical file of the patient, as well as the possibility to observe this one directly through knowledge and professional expertise, and by the help of a medical robot, different surgical interventions may be performed, interventions which, otherwise, required the patient to travel a long distance, or it would need one of the specialized physician to assist the patient.

Telemedicine supposes a long series of health care services assisted by the medical technology and telecommunications, that are generically grouped under the name of the “medical teleassistance”. Today, the most used terms are: “telediagnosis” – as the equivalent for the establishment of the diagnosis of a patient or “teleradiology”, “telepathology”, “teleendoscopy”, reuniting the relation between technology and perspectives of the medical specialities.

The aim of the Romanian doctors is to become part of an international circuit which will allow them to have access at the latest information and top medical technology.

The European Union’s representatives consider that, within future European health system, the medical expertise should be available equally, irrespective of the place where the patient is living and at the highest quality level. Thus, the improvement of the quality of the medical decisions will be supplied by the creation of a complete data base, which should contain individualized information of each patient, respectively “an electronic medical file” of the European patient. The use of telemedicine will lead to a considerable reduction of the

waiting time between informing and examining the patient by a specialized physician.

Romania should naturally follow the European present context. Despite the large costs, a first important step has been accomplished through the setting up of the Romanian Association for Telemedicine and Health Space Applications (ARTASP), which aims at connecting the Romanian health system to a national and international circuit, which should allow the most efficient use of the available resources and raise the level of the medical services. On this occasion, prof. dr. Ronald Merrell, chief of the Surgery Department of the University of Virginia and president of MEDITAC, a pioneer in the field of telemedicine, considered the set up of ARTASP as an important event; this not being a simple association, but an important benchmark in the Romanian medicine. He appreciated the important aspect of telemedicine in relation to the doctors' training and the easy access to the latest news in the field.

Another branch of telemedicine, well implemented in Europe is that used in the emergency medical assistance, through which the medical emergency teams in the field may rapidly and exactly report the medical data of the patient to a medical coordinator, with the establishment in real time, of the procedures that must be applied. Recently, the Mobile Emergency Service for Resuscitation and Extrication (SMURD), Târgu-Mureș, benefited from a telemedicine system developed through private financing. The equipments acquired allow the simultaneous transmission of the medical paramtres of the patient from the mobile units of SMURD towards the central unit and towards the County Clinical Emergency Hospital of Târgu-Mureș. The medical teams in the field have now the possibility of being in permanent contact with the coordinator physician, as well as with the physicians at the emergency room and may benefit from specialized assistance through this system.

### **Applications of the robotic surgery in telemedicine.**

The surgical robot was initially conceived by NASA, in order to perform surgeries on the American soldiers on battlefield, at a distance, through satellite. The overspecialized surgeon is safely placed in the U.S.A, on a surgical console with joysticks, surgical handles, stereo viewer in 3D, pedals (a real control panel), while the articulated arms of the robot are introduced into the patient by a team of surgeons, specialized in this field. The mechanical signals are transmitted through satellite, the precision being extremely accurate, with the existence of even a demultiplication of the surgical gesture. The computer that is interposed between the fingers of the surgeon and the robotic instruments placed in the patient's abdomen analyses each surgical move, demultiplicating it and removing the possible parasite gesture or the involuntary movements of the surgeon. Types of clinical applications:

- DICOM standard radiology;
- Pathologic anatomy;
- Primary care;

- Dermatology;
- Psychiatry;
- Surgery;
- Disasters medicine;
- Medical education;
- Military, spatial.

**Virtual surgery practice.** Probably, the most interesting application of the computer-assisted surgery techniques is their use in programmes of surgical training. If today, during the internship period of time, the surgeons are "trained" directly on human subjects, under the supervision of experienced surgeons, the tomorrow's intern, before cutting a live tissue, could become first, an expert in "tele-surgeries". The pilot of the programme of telemedicine is Fundeni Clinical Institute. This institute plays the coordinator part in the attempt to create a National System of Telemedicine. It developed the Excellence Centre for Spatial Applications in Medicine and tries to improve the quality of life. The objectives of the pilot programmes are:

- the accomplishment of an infrastructure necessary for the implementation and use of telemedicine in as many applications, as possible;
- public information and the information at Government level on the benefices of telemedicine for informational purposes and of attracting internal and external financing;
- implementing telemedicine in the health insurances system;
- public and specific medical education;
- the development of the national programme and the integration in the telemedicine international excellence networks.

Applications of the telemedicine project:

- Educational (specific and non - specific)
- Clinical and of diagnosis;
- Videoconference;

Future applications: Robotic surgery –

Endoscopic surgery:

- Da Vinci, Zeus

The partners in the telemedicine pilot project:

- „Sfântul Ioan” Clinical Hospital;
- Military Hospital, Bucharest;
- „Floreasca” County Emergency Hospital;
- County Clinical Hospital of Craiova

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