

Telemedicine Technology Experience of Medical Institute of RUDN-University

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According to World Health Organization, Telemedicine delivers health care service where distance is a critical factor and professionals use Information and communication technologies (ICT) both for diagnosis and for continuing education. Telemedicine provides clinical support, overcome geographical barriers, uses of various types of ICT and its goal is to improve health outcomes.

Telemedicine has been evolving with technology for over a hundred years from telephone invention till modern mobile technologies. The idea of providing remote medical care arose more than 100 years ago. After invention of the telephone, people tried to transmit the sound of heart tone. At the end of 1950s video for remote demonstration of patients for medical students was transmitted. When active space exploration has began, the need for remote monitoring of the physiological parameters of astronauts has arose. In 1980s World Medical Association (WMA) produced documents (Regulations) on the use of computers in medicine. But real boom begin in the 1990s thanks to global Information Technologies and International programs.

Some advantages of telemedicine: for doctors it's a possibility of obtaining second opinion; for patients in remote regions it's a possibility to receive highly specialized medical care; for institution it's cost reduction and higher profit.

However, there are some barriers for implantation of telemedicine:

- Compatibility and standardization of technologies;
- Insufficiently developed regulatory framework;
- Data protection and privacy issues;
- Telemedicine services are often not covered by insurance;
- Patients are not ready to use telemedicine;
- Lack of qualified personnel.

For Russia distance is a really critical factor. From North to South it's 4000 km. And from East to West 10000 km. Regions on the Far East and Far North have small population

density and they need consultations of doctors who usually works in a big cities. For example for medical examination of people of the Arctic zone temporary centers which use satellite channel for consulting with leading specialists are installed.



Figure 1. Business Game on Telemedicine

Especially for remote areas of Siberia, Far East, Far North and Zabaykalye mobile consultancy and diagnostic centers were created. It's so called "Health trains". Trains are modern equipment with X-rays, ultrasound, endoscopy rooms. Also trains include telemedicine room with a Satellite Communication System to produce videoconferences with leading specialists.



Figure 2. Wireless Transmission of Ophtalmological Operation

In 1997 in frame of project "Moscow to the Russian regions" the first remote interactive lecture was organized, during this lecture doctor-cosmonaut Oleg Yurievich Atkov had conversated with doctors in real time. Now we use videoconference in medical education: we've organized telelectures with interactive communication between the lectors and remote audience.

In 2015 our department of medical informatics and telemedicine developed new Curriculum module "Telemedicine" for students of 4th and 5th years. It takes 36 hours

(one credit). Main professional competence that is formed is the ability to use modern management methods to solve Medical Diagnostic problems. Some topics, that are included:

- the fundamentals of telemedicine,
- the world trends in its development;
- technological equipment of telemedicine events;
- hardware and software of telemedicine;
- economic and legal aspects of telemedicine;
- scenarios of telemedicine activities

For practical skills in our course we've included business games, for example, remote consultant doctor-doctor, remote mentoring during operations or diagnostic procedure. We demonstrate to students masterclasses from leading clinics of Russia, Europe, India, Brazil and Canada. During three years we have thought about 2000 students from different countries.

Also we have two distant programs for practitioners – “Telemedicine technologies in healthcare Practice” and “Telemedicine in the Healthcare System” - first one gives basic knowledge and another one advanced set like tele-radiology. We involve specialists from different countries for holding interactive master-classes with online broadcasting of surgery procedures. Ability to see operation “by the eyes of the surgeon” is the essence of interactive master-classes on basis of videoconferences. Russian scientists have developed hardware-software unit for wireless transmission and processing of three-dimensional visualization of the ophthalmological operation and they have several scientific patents.

Our telemedicine center is equipped with all modern ITU standards for video conferencing, HD camcorder, professional document camera, built-in illumination plate for displaying X-rays.

Teaching approach allows to obtain theoretical knowledge and practical skills of videoconferencing and distance education.

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