

Medical Informatics Europe '97



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Health Telematics in Ukraine: Problems and Prospects

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Abstract: The state of medical telecommunication networks in Ukraine is described. The concepts of creating and architecture of the National Direct Access Computer Network 'UkrMedNet' are given.

1. A Summary of the National strategy of the informatisation for health and social care

In August 1996 Ukraine celebrated the 5th Anniversary of its Independence. Nowadays preparations are in full swing for a radical reform of the entire system of health care.

The directions of high priority of the health care reform in Ukraine are the introduction of insurance medicine and institution of family doctor.

It must be underlined that the health care is going to be reformed in the country suffered from the ecological disaster of the global scale - the Chernobyl disaster. It influenced and still influences the health of hundreds of thousands of people. Also note that Ukraine occupies 607,7 thousands of sq. km and has the population of about 52 million.

Under these conditions the key roles begin to play the state-of-the-art information technologies which make it possible to solve all the above problems quickly, effectively and least expensively.

The basis of the comprehensive infrastructure of medical informatics is the creation of the National Direct Access Computer Network 'UkrMedNet'. The 'UkrMedNet' project has been developed according to the Concept of the State Policy in informatising the health care in Ukraine [1] (adopted in June, 1995), Order of the President of Ukraine No. 186/93 from 31.05.1993 'On the State Policy of informatisation in Ukraine', decision of the Cabinet of Ministers of Ukraine No. 605 from 31.07.1994 'Problems of Informatisation'.

The project has been studied and approved at the meeting of the Working group of the Ministry of Health of Ukraine on 19.02.1996.

The goal of the project is to organise a system of medical and ecological information exchange in Ukraine, as well as outside, based on the state-of-the-art communication technologies.

Ukraine already has an experience in the creation of national medical networks and databases which are to be integrated into 'UkrMedNet'. First of all there are two most developed medical networks operating within the framework of the acting national computer network of the first generation 'HealthNet'. For this the latter will be transformed into 'UkrMedNet'.

The most sophisticated of these two is the National register of the persons suffered from the Chernobyl disaster. This Register monitors the health of nearly 600,000 persons. A

computer network has been created in order to maintain this Register, covering 25 districts and cities under direct central administration - Kiyv and Sebastopol.

The second most sophisticated network is the net of the Sanitary and Epidemiological Service of the Ministry of Health of Ukraine based on the computer centres of the district health care administrations (ca. 70 computer centres) which transmits operative information on the current sanitary, epidemiological and ecological situation to the Ministry of Health of Ukraine. These nets are integrated in a common net called 'HealthNet'

At present the National Open Direct Access Medical Net-work is under creation on the basis of existing HealthNet and some other autonomous medical networks. This project also envisages the integration of all existing separate medical nets, medical universities and medical R&D institutes of Ukraine into one 'UkrMedNet', as well as the creation of a common informational space and its integration into the European one.

2. The main objectives are aimed to:

1. Update the National medical computer network to the state-of-the-art level using advanced computer technologies, communication lines and telemetry technologies, integrate it into the Internet.

2. Integrate the medical universities and R&D institutes of Ukraine into the Internet.

3. Create and maintain WWW servers supporting both Ukrainian and Russian and English languages, support references to these WWW-servers; integrate the Chernobyl Register net into 'UkrMedNet' and create a WWW server containing the Chernobyl Register information. Provide the 'UkrMedNet' users with the access to the created WWW servers, and provide this access via European partners (providers), to all countries (in Europe, both Americas, Asia and Africa).

4. Hospital information systems (HIS) of various levels (district hospital, regional hospital, specialised institute) equipped with up-to-date telecommunication facilities for transmitting biological signals and pictures (EEG, ECG, Ro-grammes etc.), texts, graphics, audio and visual information according to the telemedicine concepts; integrate these systems into the 'UkrMedNet' and provide an access to the Internet therefrom.

5. Create and maintain the data banks on the patients requiring organ transplantation and unite them with the existing cell and tissue banks within the information-and-co-ordination nucleus of the 'Ukrtransplant' system; connect the State information system of organ, tissue and cell transplantation in Ukraine to the similar European 'Eurotransplant' system via the Internet.

6. Train medical specialists to work with the telematics applications, advocate the utilisation of up-to-date communication technologies in health care. The project envisages the creation of a Republican or International Training Centre based on the Department of Medical Informatics and IT in Health Care Management of the Kharkiv State Advanced Training Institute for Physicians, and preparing and conducting a course of lectures and workshops on the theoretical aspects and implementation of the telematic applications in the health care of Ukraine.

7. Load the servers with the information on the following sections:

- Strategically important information on radiological, epidemiological and toxicological monitoring;

- Data bases with quick access information and instructions on urgent measures in emergency situations;

- Information on the branches of medicine;

- Medical information for general public, including: diabetes, epilepsy, pregnancy, cardiovascular diseases, healthy way of life and rational nutrition, toxicology and pharma-

ology, data on prohibited food products, current pharmacological advises, other relevant information for general public.

- Information from other fields of knowledge necessary for health care (biology, physics, chemistry, etc.);

- Some data on industry and agriculture;

- Other information of economical, geographical and demo-graphic nature;

- Information specially selected and prepared for medical students;

- It is planned to create a data base related to business activity, first of all medical insurance, paid medical service and products of health care.

The information will be organised on the net in the form of hypertext distributed data bases with multimedia components (graphical, photo, audio and video illustrations) located in the WWW servers of the National (central) telecommunication node, inter-regional nodes and WWW servers of the specialised institutes (i.e. institutes of oncology, neurology and psychiatry, children and adolescents health protection, maternity health care, AIDS institute).

This will make accessible to the general public the vast amount of information accumulated by the concerned leading R&D and other organisations in Ukraine. We suppose that this work will compose a part of the programme of development of telecommunication means in Ukraine.

3. Organisational basis of the project

The project is co-ordinated by the Ukrainian Association of 'Computer Medicine' (UACM), which is an amalgamation of 56 R&D institutes, universities, scientific societies, hospitals and enterprises located in various districts of Ukraine, dealing with the development and utilisation of informational technologies in health care. The UACM has a Scientific Council consisting of 68 leading scientific experts in the fields of medical informatics, medicine, radioelectronics from Ukraine, N.I.S., USA, Japan, Great Britain, France and Poland. Such an association makes it possible to reach in the best way the project goal and objectives and co-ordinate the efforts of the participants of the project.

Within the framework of the National Network of Ukraine we will support all district and regional subject information projects.

4. 'UkrMedNet' architecture

'UkrMedNet' is a three-level structure.

The first level of the Net consists of the National and four Interregional nodes. All the nodes of this level have a similar structure and service 5 or 6 districts (district nodes). It will be connected to the National node in Kiyv.

The Ukrainian National node performs also the functions of the interregional node for Kiyv and adjacent districts.

All Interregional nodes are directly connected to:

a) national node; b) one of interregional ones; c) one of Internet nodes which is not a part of the Net of the Ministry of Health care of Ukraine. Such connection layout ensures doubling of the connections of the first level nodes, i.e. ensures virtually 100%-proof data transmission. This enables us to consider the proposed architecture to be highly reliable.

The National and Interregional nodes ensure connection to the Net of the second-level nodes, as well as direct connection of large scientific, medical organisations and universities. The second level of the Net is formed on the basis of the district health care departments. The second-level nodes are connected to the nearest inter-regional node. They

ensure connection to the net of medical organisations located in the district, preferably connection to the Internet which is not a part of the net of the Ministry of Healthcare.

The third level are regional nodes and end users. They are connected to the nodes of the district health care departments. Within the scope of this project this level is built on the basis of organisations - members of UACM, as well as all health-care organisations willing to join the project at their own expense or at the expense of the Ministry of Healthcare of Ukraine within the scope of the programme of development of telecommunications in Ukraine.

5. Benefits

Due to the development of the Ukrainian National Medical Network will obtain the possibility to exchange medical, ecological and scientific information.

Physicians, scientists in R&D institutes and universities will obtain access to the necessary information, receive electronic copies of scientific journals and articles, be able to run programmes unavailable on their equipment.

A unique regional computer network for calculating and analysing sanitary-and-epidemiological situation will be created as a component of the integrated network of the Ministry of Healthcare of Ukraine.

The Ukrainian national systems on transplantation of organs, tissues and cells, connected at present with 'Eurotransplant' will be incorporated in the unified European computer system of organ transplantation, thus giving Ukraine a real opportunity to join the progress in this field. The information technology adapter to the national conditions will be created for supporting organ, tissue and cell transplantation operations on the national and regional levels.

Basing on the international experience a technical project with standardised patterns of data bases and solutions will be created, as well as standard programme modules with standard input and output files to be used in central and regional information and analytical systems in order to ensure the functioning of all data bases of the higher level.

Due to the network development the EU countries will obtain the possibility to carry out many joint projects together with medical specialists in Ukraine. Thus, the R&D potential will be stabilised.

Using up-to-date information technologies, many scientists in Ukraine can fruitfully and effectively co-operate with colleagues from other European countries literally staying at home.

For the country occupying a vast territory, which has found itself in a dramatic economical situation, very important will be the creation of consultative telemedical centres. This will make it possible to provide at low cost the population, first of all in remote rural regions, with qualified consultative and diagnostic medical aid.

Thus, the creation of the National Direct Access Computer Network 'UkrMedNet' has a tremendous medical and social significance for Ukraine and will accelerate the integration of the country into the world informational space.

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