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Concept Of Medical Information

S.S. Nabiyeva[1], A.A. Rustamov[2], M.R. Malikov[3], N.I. Ne'matov[4]

[1]*Assistant of the Department of Information Technology*
Samarkand State Medical Institute
Samarkand, Uzbekistan
[2]*Assistant of the Department of Information Technology*
Samarkand State Medical Institute
Samarkand, Uzbekistan
[3]*Head of the Department of Information Technologies Associate Professor*
Samarkand State Medical Institute
Samarkand, Uzbekistan
[4]*Assistant of the Department of Information Technology*
Samarkand State Medical Institute
Samarkand, Uzbekistan

E.mail: sevar0887@mail.ru

Abstract This article deals with the main subject of medical informatics, namely medical information. Its definition is given, the types of medical information are classified and their properties are determined. Focused primarily on professionals, it contains a description of methods, models of technologies for the development of complex information systems, which include MIS. The main focus is on the organization and design of the storage subsystem.

Key words: MIS, technology, strategy, medicine, system, model, method, principle, integration.

1. INTRODUCTION

We are contemporaries of the next industrial revolution caused by the rapid development of information and communication technologies in recent years. The result was the emergence of a new subject of labor and a new type of product - information as such. That is why this revolution is called information revolution.

There are symptoms of a fundamental paradigm shift in the scientific and technological revolution. Changes in technology and production are happening so quickly that it seems chaotic and disorganized. Classical control theories turn out to be unable to bear the load of continuously increasing amounts of information.

The term "information age" appeared, which, on the one hand, demonstrates that information is becoming the driving force of scientific and technological revolution, and on the other hand, expresses the tendency of a modern person to think in terms of an information metaphor. Moreover, the most remarkable tendency of the information revolution is the tendency to increase the rate of its development.

In the period of electronic presentation of information, the industrial revolution offers information management technology based on global communications. Computer systems are becoming a tool of labor, for which information is the result, and collective access to this information is becoming the most common way of organizing production. Thus, the purpose of computer systems is gradually shifting from the automation of manual labor of individual

workers to the informatization of the activities of all personnel. Information is becoming the main corporate resource.

In medicine, ensuring timely access to information becomes critical when it comes to people's lives. Possession of the necessary information, current or historical, is often the only thing that a doctor lacks in order to provide the patient with the necessary medical care in a timely and qualified manner. Routine document circulation, lost copies of documents, geographically dispersed information about the same patient, lack of qualified search methods - all this takes time and energy from medical specialists and significantly reduces the effectiveness of their activities. In addition, the amount of information that a doctor must constantly keep in mind in order to be able to assess the condition of each patient is certainly enormous. When the volume of processed information exceeds the value of some critical parameter, individual for each person, the ordering and systematization of this information becomes impossible. To retain the ability to process continuously increasing amounts of data, it is necessary to switch to a new method of collecting and processing information, which can be considered as a kind of individual information revolution, the result of which should be the beginning of the use of a new tool in the professional activity of a specialist - an information system.

Let's try to define what is meant by an information system.

When developing such an information system, it is necessary to pay attention to a number of important points, among which are prominent:

- detailed analysis of the structure of the organization and mechanisms of interaction between various participants in internal and external processes;
- planning the software and hardware and resources required for the operation of the system;
- detailed calculation of the resources required to develop system maintenance;
- the need to implement means of using information from information systems and software complexes of the institution that were used in it before the development of the system (legacy information systems).

Such recommendations, of course, can help the developer build a more or less rational model of a medical information system at a sufficiently high level of abstraction. However, the conditions of the real world are so diverse, the number of combinations of various parameters in each particular case is so great that no even the most detailed methodology is able to lower the abstraction of this idealized model to a level acceptable for developing a specific system. Therefore, the authors of this book did not set themselves the goal of giving the reader a ready-made tool for developing medical information systems. It is precisely because of the complexity and ambiguity of the subject area, precisely because of the responsibility for the health of other people, which indirectly falls on the developer of the medical information system, that the specificity of medical informatics is such that the methodology for the development of each specific information system should be determined precisely by the conditions in which this system will be exploited. That is why there is still no successful universal medical system in the world that would be used without any modifications in several medical organizations, like, for example, financial applications, office systems or industrial process automation systems. The existing so-called serial medical systems are universal only to some extent and necessarily provide the possibility of customization to adapt to the requirements of each particular medical organization.

The relevance of the problem.

Another feature of medical informatics is the variety of aspects of understanding medical information. So, there are many ways to classify models, methods and principles, each using its own terminology. However, none of these classification methods has the

properties of completeness and integrity, since it is just a slice of the subject area in one of the many possible planes. Within their plane, many of the existing methods really have completeness and integrity, they really implement an integrated approach to understanding the problems being solved, however, every time huge amounts of information, a huge number of aspects that do not lie within the illuminated plane, remain unaccounted for, making it impossible for the classifier to claim absolute objectivity his recommendations.

That is why the authors of the book tried to present the information, taking into account all points of view whenever possible, indicating their strengths and weaknesses and limiting themselves to their recommendations only in cases where the advantages of any one model clearly prevail over others.

In medical technology, - the reproduction and restoration of human resources based on new technological advances. It is human resources that have become for Russia now, of course, the most critical indicator that should first of all be taken into account when developing a strategy for planning the country's further development. In this light, the training of qualified specialists in the field of medical informatics, as well as familiarizing everyone with its basic principles and methods, becomes a particularly important task.

Any human activity is a process of collecting and processing information, making decisions based on it and implementing them. With the advent of modern computer technology, information began to act as one of the most important resources of scientific and technological progress.

The concept of information is one of the basic general scientific concepts. Therefore, it is impossible to give an exact definition of information through other concepts. The content of the basic basic concepts in each science should be explained by examples or revealed by comparing it with the content of other concepts.

There are many definitions of information. For example, the general theory of information defines it as follows [Yankovsky, 2000]: “Any interaction between objects, during which one acquires a certain substance, while the other does not lose it, is called information interaction. In this case, the transmitted substance is called Information.”

A simple and understandable definition of information is given in [Ozhegov and Shvedova, 1999]: “Information is: 1) information about the surrounding world and the processes taking place in it; 2) messages informing about the state of affairs, about the state of something.”

2. RESEARCH RESULTS.

Along with the many definitions of the concept of information, there are many classifications of information, one of which is shown as an example in table 1.

Table 1

Types of information

By the way of perception	**By presentation form**	**By public importance**	
Visual	Text	Mass	Everyday
Audial	Numeric	Special	Socio-political
Tactile	Graphic	Personal	Aesthetic
Olfactory	Sound		Scientific
Flavoring			Production
			Technical
			Managerial

			Knowledge, skills Forecasts, plans Feelings, intuition

As shown above, there are many definitions and classifications of information. In modern literature, the phrase "medical information" hides two concepts. Medical information in the broad sense is any information related to medicine. And in a narrow sense, it is information directly related to a person as a patient, that is, information about his health, characteristics of the body, past diseases, etc. Recently, the term "medical information" is increasingly used in a narrow sense. Further in the text, we will adhere to exactly this understanding of medical information.

Types of medical information

All types of health information can be divided into four main groups:

alphanumeric information;

visual and graphic information: a) static; b) dynamic;

sound information;

combined types of information.

ALPHABETIC-DIGITAL INFORMATION.

Alphanumeric information is the basis of almost all forms of printed and handwritten documents (except when the document is a graph or diagram). It makes up the bulk of medical information.

STATIC VISUAL-GRAPHIC INFORMATION.

This category of medical information includes various images (radiographs, echocardiograms, etc.).

Depending on the technical means and other features, the information obtained can be gray-scale (for example, an X-ray image) or color (for example, an endoscopic image).

DYNAMIC VISUAL INFORMATION (VIDEO)

Examples of such information are patient gait, facial expressions or convulsions, tendon reflexes, pupil response to light, dynamic image generated by diagnostic equipment.

SOUND INFORMATION

Sound information includes speech, electronically amplified natural sounds of the human body, and sound signals generated by medical equipment.

Examples of speech information are the commentary of the attending physician, the speech of a patient with a neurological or mental pathology, the speech of a patient with a pathology of the larynx.

Examples of audio signals generated by medical equipment are Doppler blood flow signals from echocardiography, flowmetric signals, signals from fetal monitors, etc.

Some types or individual cases of audio information can be part of combined types of medical information (for example, in combination with visual-graphic information).

COMBINED TYPES OF INFORMATION

Medical information is called combined, which is any combination of alphanumeric, visual-graphic and audio information.

The most "visual" combined type of information is the combination of dynamic visual information with audio. However, in practice, other combinations are also widely used: for example, static visual information with audio, static visual information together with alphanumeric and others.

The nature of medical data

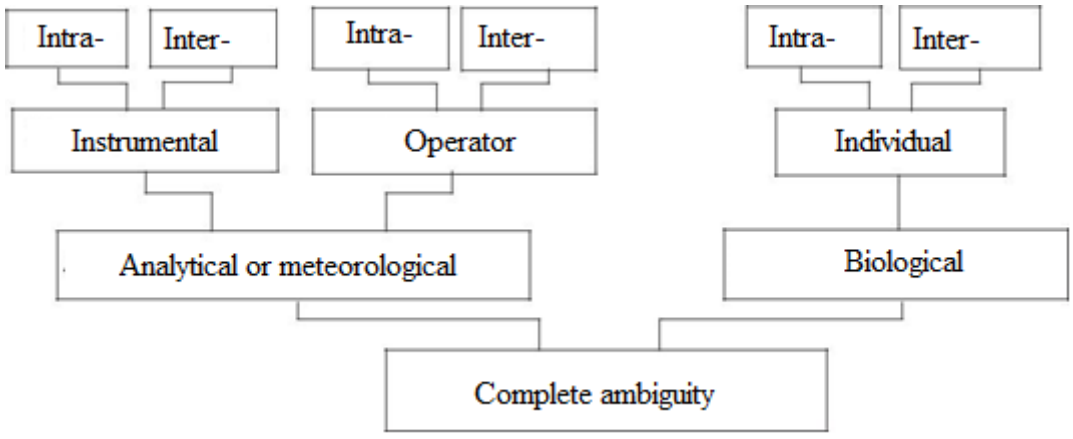
In medical practice, the expressions "collecting data" or "obtaining information" are often used. These expressions can be misinterpreted on the assumption that medical information is contained in the real world in a state of readiness for diagnostic or therapeutic use. In fact, some objective parameters, such as biological dosage, can be interpreted or, in other words, become information only in the context, for example, the motivation for the appointment, the conditions for obtaining the blood sample, the method used for the measurement, and so on. Symptom A clinical or radiological sign is the result of a complex decision-making process. Medical professionals must constantly review one or more hypotheses and look for elements that support or reject each of them. The remaining hypotheses should be taken as a basis for obtaining complex information and for making a decision.

Therefore, medical information as such only exists in an interpreted environment and must be constantly updated to avoid diagnostic and therapeutic errors. The hypotheses arising among doctors determine the direction of data collection and the criteria for assessing the "usefulness" of information. Subjectivity plays a predominant role in medicine. This situation partly explains the inexhaustible nature of medical information. Information may be missing because the patient was not asked a question, or because the patient's response was not recorded. Thus, it is noted in the literature [Bentsen, 1976] that up to 40% of the problems identified in the course of the research were associated with the fact that medical information was not correctly stored.

Therefore, the assessment of the quality of medical data is very important and should first of all make it possible to assess their information value.

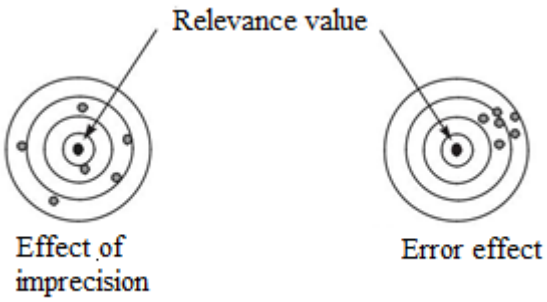
Medical information ambiguity

The level at which medical observations can be judged to be successful depends on the methods used to measure (analytical ambiguity), the operators or observers (intra- and inter-operator ambiguity), and the subject of observation (intra- and interindividual ambiguity). The relationship between the various types of ambiguity is shown in Pic. 1 [Degoulet and Fieschi, 1997].



Picture 1. Sources of medical information ambiguity

Medical data does not always provide up-to-date information and cannot be used to uniquely identify a disease. The measurement results (values of medical variables) may deviate from the actual (real) values due to inaccuracy and / or inaccuracy (see Pic. 2).



Picture 2. Effect of bias in medical variable values

The accuracy of measuring clinical information is difficult to establish, since it largely, directly or indirectly, depends on the physician's point of view on each clinical case.

Problems in the field of medical information presentation.

The following main problems in the field of medical information presentation can be identified:

- a large number of unrelated specialized terminological systems;
- differences in the interpretation of the concepts and terms used;
- insufficient implementation of technologies for reflecting the semantic meaning of terms;
- difficulties in reusing encoded data in different medical contexts.

Problems and errors in the use of computer technology

The lack of strategic and tactical planning at the stage of developing a medical information system usually leads to the following problem situations:

- incompatibility of interfaces of some systems;
- lack of integrated access to medical, administrative or reference information;
- inadequacy of the system to the requirements of the end user;
- lack of expected performance;
- lack of necessary support for standards;
- insufficient or exhaustion of system resources;
- discrepancy between the applied information technologies and the strategy of the medical organization.

Most of these situations arise not because of technological errors, but because of deficiencies in control. Moreover, the problem lies in the absence or inadequacy of methodology for the use and management of existing technologies [Bourke, 1994]. Most of the failures in the development of information systems projects are caused not by technological failures, but by methodological and organizational errors, among which the following can be distinguished:

- incorrect prioritization in the organization of work;
- selection of standards and technologies that are not adequate to the tasks set;
- inability to achieve consensus and agreed vision of problems;
- non-observance of organizational and technical requirements;
- lack of provision of technical personnel with appropriate tools, skills and authority;
- lack of clearly set goals, methods for assessing efficiency and control and accounting policies;
- incorrect organization of access and secrecy of information. For the successful implementation of the information system, it is necessary to adhere to the accepted standards and models for supporting the software life cycle.

Models and methods of organizing software development

The specification phase defines the requirements of the users in terms of the functionality of the computer system as that functionality would appear from the outside. The question to be answered is "WHAT is a system?"

The design phase provides an accurate model of the system and a detailed description of its implementation ("HOW to build the system?"). This phase is often divided into two steps: architectural design and detailed design, the result of which should be a kind of formalism, on the basis of which further coding of programs will be carried out.

The implementation and development phase corresponds to writing programming code.

The validation phase is the verification of the adequacy of the system to the specified requirements. It implies the installation and testing of the system in real life situations.

During the maintenance and support phase, system updates and improvements are carried out in accordance with the modified requirements.

The peculiarity of this model is the following: not a single step can begin until the previous step is completed and its compliance with the requirements is checked at a certain checkpoint.

3. CONCLUSION

Information technologies can be successfully applied in various fields of modern medicine. For example, in the area of patient safety, modern automated systems can improve quality control and safety of medicines and medical services, reduce the likelihood of medical errors, provide emergency services with quick communication and access to vital information about patients. Modern technological solutions are able to provide free access to medical services regardless of the patient's place of residence, significantly increase the availability of high-tech medical services, medical expertise.

Thus, we can safely say that medical information systems, consisting of many specialized modules, help in the simultaneous solution of diagnostic, therapeutic, management, financial, statistical and other problems. In turn, all this ultimately contributes to the achievement of the ultimate goal of any medical institution (MCI) - to provide quality medical services.

4. LITERATURE

[1] Sakiev T., Nabieva S. Architecture of the medical information system. International Scientific Journal Theoretical & Applied Science. Section 4. Computer science, computer injineering and automation. Issue: 05 Volume: 61. Published: 14/05/2018. p. 35-39

[2] Brian Dixon "Health Information Exchange: Navigating and Managing a Network of Health Information Systems", Academic Press, vol. 1, 2016, 376 p.

[3] Qarshiev A.B. S.S. Nabieva, A.Sh. Egamqulov Medical information Systems // Internotianal Scientific Journal Theretical & Applied Science Issue 04, Vol. 72, 2019 y.

[4] V. V. Bogoslovsky, "Prediction of productivity, adaptation capacity of species and hybrids of the silkworm for enzyme systems and proteins spectra the Text .: dissertation of candidate of biological Sciences," / V. V. Theological, Stavropol, 2009.

[5] S.A. Feylamazov, "Information technologies in medicine: A manual for medical colleges", Makhachkala: DBMK, 2016, -163p.

[6] Karshiev A., Nabieva S., Nabiyeva I. Medical information systems. International Scientific Journal Theoretical & Applied Science. SECTION 4. Computer science,

computer injineering and automation. Issue: 04 Volume: 72. Published: 30/04/2019. p.505-508

[7] Sakiev T., Nabieva S. Typical processes of AWP. International scientific and practical journal "Theory and Practice of Modern Science" Issue No. 7 (25) (July, 2017).

[8] Scott Coplan "Project Management for Healthcare", Information Technology McGraw-Hill, Education; vol. 1, 2011, 288 p.

[9] Sakiev T., Nabieva S. Principles of computer design. International scientific and practical journal "Theory and Practice of Modern Science" Issue No. 7 (25) (July, 2017).

[10] Primova H. Sakiev T., Nabieva S. Development of medical information systems. XIII International scientific and technical conference "Dynamics of Systems, Mechanisms and Machines" November 2019, Omsk, Russia. (Scopus).