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Automated Control Systems in Medicine

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ABSTRACT: The current state of health informatics development in the Uzbekistan puts in a number of urgent task of modernizing the information systems of health care organizations. In this paper comprehensively deals with the modernization and development of e-health medical organization. It focuses on the automated management system of medical organizations. A mathematical model for calculating the effectiveness is represented. The proposed approach can be used by leaders of health care organizations, heads of departments of information to build a system of regulations that organize the work on the modernization and development of medical information systems.

KEYWORDS: healthcare information systems, management information systems, the effectiveness of the implementation of information systems

The current state of development of health care informatization the trend in Uzbekistan is characterized by the full-scale implementation of information systems in the activities of medical organizations (hereinafter referred to as MO), while all aspects of the activities of the MO are affected, including resource management, management of the treatment process and the provision of medical care. The construction of the Unified State Health Information System as the main result of informatization, started in 2017 in the Health Modernization program and continued under the current Health Development Program, opens up unlimited opportunities for introducing information technologies into Uzbek health care.

In this regard, the development of reasonable requirements for the creation of an effective information system for a large multidisciplinary medical organization, integrated with the CHI information system (CHI IS), the Unified State Health Information System (EGISZ), the Unified Medical Information and Analytical system (EMIAS) of Moscow, other information systems seems to be an urgent and important task.

The electronic medical system of a medical organization (hereinafter referred to as EMSMO) is understood as a set of clinical departments, educational departments, administrative and economic departments, scientific departments and other bodies of the Ministry of Defense, whose activities are related to the provision of medical care, organization and management of the treatment process and financing of the treatment process, education of students for all levels of education based on the use of information technologies and systems, including electronic document management, telemedicine and automation of all processes that make up this activity. In fact, EMSMO is a combined application of telecommunications and information technologies for managing resources and the medical process in the MD, as well as for disseminating information about the activities of the MD.

EMSMO is supported by financial, regulatory, organizational, personnel, mathematical, software and technical support for the activities of its participants.

EMCMO is not limited to the provision of medical care, but covers medical education, health education and marketing in the field of paid medical services.

The modern market of medical services using information systems and telemedicine is rapidly developing, more than 2 million different remote monitoring devices are used in the world. EMSMO allows you to provide medical services using information and telecommunication technologies. This includes a wide range of capabilities, including monitoring, storing, viewing and managing patient information (represented by various digital forms such as video, audio and informational materials), as well as the transfer of this information between different information systems through communication channels.

GOALS OF CREATION, OBJECTIVES AND ARCHITECTURE OF EMSMO

Improving the efficiency of managing the medical process in the Uzbekistan based on information technology support for solving the problems of managing the medical process in the Uzbekistan, forecasting and planning

resources for the provision of medical care, as well as monitoring compliance with the quality of medical care. This goal involves solution of the following tasks:

- a comprehensive analysis of the activities of clinical departments, including the calculation of the real cost of medical care provided, the assessment of the quality of work of clinical departments based on the criteria being developed, forecasting the development of the volume of medical care provided, substantiation of priority areas for the development of types of medical activities that generate income;
- forecasting the need for medical care based on the predicted values of indicators, preparing decisions on resource management;
- planning reasonable costs for the provision of planned volumes of medical care in accordance with quality standards, application of methods for calculating the cost of medical services;
- prompt receipt and monitoring of reliable primary data on the volume and quality of medical care provided by clinical units;
- a comprehensive analysis of the impact of managerial decisions on the provision of clinical departments with resources, including financial ones, the efficiency of their use, ensuring guarantees for the provision of medical services in the required volume and in accordance with quality standards;
- collection and analysis of medical statistics, analytical and operational data, timely and visual informing the leaders of the NMCC;
- assessment of the efficiency of spending financial resources and control over the provision of medical services and the circulation of medicines, taking into account medical and medical and economic standards, assessment of the real cost of medical and medicinal care provided;
- monitoring of the equipment of clinical departments with the necessary material and technical resources, analysis of the compliance of the material and technical provision of organizations with equipment standards, optimization of the purchase of consumables and components, monitoring of the workload of high-tech medical equipment, analysis of information on the status, operation and use of software and hardware;
- monitoring the staffing and staffing needs of clinical units, planning the volume and structure of training, retraining and advanced training of medical workers, monitoring the timely completion of training, assessing the qualifications of medical and pharmaceutical personnel and linking their salary level with quality and volume provided medical care;
- managing patient flows, ensuring the possibility of a guaranteed visit to the required specialist, planning an appointment with a doctor, providing telemedicine services, maintaining a queue for hospitalization;
- providing access to an integrated electronic medical record and other subsystems of the Uniform State Health Information System;
- development of requirements for information exchange with an electronic medical record (EMR), provision of automated collection of indicators based on primary accounting data.

The expected effect of the development of EMSMO is to achieve the following indicators:

- reducing the cost of medical care by reducing the number of unnecessary diagnostic studies and their duplication, the transition to the use digital technologies in conducting radiological and other studies related to the processing and transmission of video images;
- reducing the time spent by medical personnel on searching for the necessary information about the patient and accessing it, working with hard-to-read paper medical documents, preparing accounting and reporting documents;
- improving the quality of medical care and medical and economic expertise through the possibility of attracting a wide range of medical experts and consultants from various medical institutions in Uzbekistan and other countries;
- reducing the number of unsuccessful cases of medical care related to medical errors, a low level of efficiency, completeness and reliability of information about the state of health of patients, by providing prompt access to information, the possibility of providing telemedicine services;
- reducing the cost of drug provision by improving the accuracy of planning the need for expensive and perishable drugs;



- improving the quality and accessibility of medical care through the introduction of best practices, standardization, improving the accuracy of planning and distribution of the necessary volumes of medical care and resources in clinical units;

- creation of additional jobs in the structure of the MO, the development of scientific thought in the field of medical informatics, methods of artificial intelligence and information technology, the formation of a layer engineering and scientific personnel of a new quality level, commensurate with leading medical centers;

- introduction of new methods and technologies of medical care related to telemedicine, artificial intelligence methods, robotic systems, information technologies into the practice of clinical departments, which will significantly increase interest in the development of medicine and increase the prestige of medical care.

The introduction of a full-fledged EMSMO is impossible without the effective implementation of ASMS MO. Therefore, the methodology for calculating the effectiveness of the implementation of ASMS MO can be applied to the entire electronic medical system of a medical organization.

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