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DEVELOPMENT OF AUTOMATED INFORMATION SYSTEM

"MEDICAL HELP"

according to the needs of COMMUNITY MED HUB Medical and social center,st. Cuza Voda, 1/5, municipality Kishinev
(Technical exercise)

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Contents

COMMON PROVISIONS

The information system "Medical help" will come in support of the unified information system of public association "Positive initiative".

The beneficiary's vision of the system's functioning is to obtain a system that is easy to use. The information system should be comprehensive, with the following key characteristics:

- It should be created and developed based on thorough analysis conducted jointly with medical staff, to include and optimize all activities of the Medical-Social Center, following modern models of the same sector in European Union countries.
- Efforts should be made to reduce the number of files (paper) that are difficult to manage.
- Efforts should be made towards the efficient organization of patients' time in the office, in terms of obtaining a significant percentage of medical consultations rather than bureaucratic ones.
- Modernization of primary medical services should be carried out in the same direction as European Union countries in the medical sector, fully complying with the laws of the Republic of Moldova.
- It should be user-friendly and utilize basic computer skills of users.
- It should constantly ensure data protection and have the ability to interact with other IT systems.
- Management of patients seen by family doctors through an electronic application capable of interfacing with similar IT systems to ensure compliance with the actual situation and reporting.
- Implementation of accurate resource representation (doctors, offices, equipment) through the generation of comprehensive reports.
- Consultation of the electronic patient file by doctors in accordance with legal provisions on access to personal information.
- Generation of statistical reports for internal management and for institutions subordinate to the medical institution.
- Creation of a connection point with other IT systems; examples: clinical laboratories, pharmacies, existing information system.
- Optimization of the payment mechanism.

The system will be designed for:

- Automating the flow of information within the medical-social center.
- Creating a local database with information enabling the maintenance of a patient's

medical record.

- Increasing the quantity and quality of medical services provided to patients.
- Significantly enhancing the efficiency of medical document routing and circulation.
- Promptly receiving updated information and presenting it to governmental authorities.

Information system will provide:

- Electronic management of patient electronic files;
- Electronic management of patient appointments with specialist doctors;
- Electronic log of consultations with specialist doctors;
- Electronic records of vaccinations or other procedures administered by doctors;
- Generation of statistical reports and reports necessary for monitoring the health status of the population;
- Computerized management of medical staff within the medical system.

Information system must be suitable For use V medical social center and can be used by any doctor using standard IT equipment: desktop/portable personal computer With operating room system.

The main purpose of a medical information system is to organize effective work and management in the healthcare sector based on information ensuring the tasks of forecasting and planning costs for the provision of medical help, A Also control behind compliance state guarantees. behind volume And qualitytheir provision.

FUNCTIONAL REQUIREMENTS AND REQUIREMENTS FOR PRODUCTIVITY

The information system should be formed by a logical core, encompassing the data of all accounting and control objects of the system, as well as interaction scenarios between them. The formation of the information field occurs through the manifestation of object characteristics as a result of their interaction, according to the scenarios under which activities are carried out in medical centers. However, it includes:

- Data objects
- Medical scenarios in primary healthcare;
- Data is collected and organized through the IT platform

Information objects of IT system

Objects of data in the information system include:

- Patients and medical personnel involved or engaged in carrying out medical actions within the clinical center and its branches;
- Documentation related to the medical act, such as consultation documents, prescriptions, requests, and results of laboratory tests, etc. This set of medical information, which represents the link between the patient and their interaction with the primary medical system, constitutes the patient's electronic medical record.

FUNCTIONAL REQUIREMENTS FOR THE INFORMATION SYSTEM

No.	Functional requirements description
1.	The system should allow organized collection of patient information
2.	The system should be accessible for use by all primary medical personnel interacting with the patient
3.	The system should have a security mechanism that allows users strict access to data required for their job (e.g., doctors will have different database content rights than assistants)
4.	The system should present information in a structured format optimized for each type of user (doctor, assistant, registrar, etc.)
5.	The system should have configuration options for multiple doctors in one office
6.	The system should have a mechanism to protect against human error; it should alert users when procedural protocols are not followed
7.	The system should have a mechanism for centralized updates (e.g., an up-to-date medication list should be accessible to all users regardless of their location)
8.	Data about any patient entered into the system should not depend on the location from which access is made to them
9.	The system should automatically generate specific reports for higher-level departments
10.	The system should operate in accordance with security requirements typical for processing personal data
11.	The system should have the capability to integrate with equipment that allows for faster registration of patients' passport data (surname, given name, IDNP, etc.).

TECHNICAL REQUIREMENTS

No.	Description functional requirements
1.	The medical information system must be built on licensed software. To confirm, the Participant must provide a copy of the copyright registration certificate for the work - the Medical Information System being offered. If the participant is not the manufacturer of the

	proposed software product, they must provide a list of permissions from the manufacturer.
2.	Information protection in the medical information system must be ensured through cryptographic information protection software. To confirm, the Participant must provide a copy of the copyright certificate for the work - the cryptographic information protection program being offered. If the participant is not the manufacturer of the proposed software product, they must provide a list of permissions from the manufacturer.
3.	Hardware and software scalability should be possible as the workload increases.
4.	Single entry and multiple use of primary information
5.	The ability to log all access to information and modifications (creation, editing, extraction)
6.	The system architecture can be client-server, three-tier (database level, application server level, client level), and it must support remote work via the Internet.
7.	Database server - a relational database server containing all system data.
8.	Server application - a server that can be used as a client PC server application. Used to interact with the database server.
9.	The system architecture must be scalable, i.e., it must provide the ability to add, for example, additional database servers and/or application servers without changing the system's source code.
10.	The system must provide options and mechanisms for installing updates (new features, releases, bug fixes, security updates, legislative requirements implementation, etc.).
11.	The system must, if necessary, have the ability to interact with external information systems.
12.	It should support the export/import of data to related information systems (e.g., using data files in .xml, .csv, .xlsx formats or interface tables) and have the ability to exchange data with related information systems using standardized data exchange protocols.
13.	The system must allow for the deployment and installation of medical information system servers at the Customer's premises (data processing center).
14.	The system must provide access to its data only to authorized users.
15.	Access restrictions to information must be provided in accordance with the rights established in the system.
16.	The system must log all user actions regarding information changes. Information about the corresponding actions must be detailed (recording changed attribute values and those that were different).
17.	The system must log all user actions regarding access to personal data, enabling each person whose data was accessed to obtain a detailed report of who and when viewed this information.
18.	The system must incorporate mechanisms for using electronic digital keys from certified centers to sign data.
19.	The system must ensure encryption of data stored at the central level, using encryption libraries that have passed appropriate certification by the State Security Service.
20.	The information system must provide the following roles: Registrars Main tasks: Registration of individuals entering the clinic. Searching for patient information in the database. Registration of patients at the medical-social center. Making appointments with doctors, psychologists, and social workers. Management and accounting.

21.	Physicians Main tasks: Registering the results of patient check-ups. Recording diagnoses. Registering medical diagnoses (medication and surgical treatment and laboratory, radiological, and other special examinations). Generating investigation referrals. Creating and printing medical documentation.
22.	Mid-level medical staff Main tasks: Processing medical prescriptions according to the patient's profile. Preparing materials for laboratory tests. Recording the storage and use of medications in departments. Entering the results of various examinations (laboratory, diagnostic, etc.). Creating and printing medical documentation (referrals, certificates, etc.).
23.	Administration of the healthcare institution Main tasks: Comprehensive analysis of medical, economic, and administrative information.
24.	Medical Statistics Main tasks: Viewing/registering statistical information, generating statistical reports on the healthcare institution's work with the ability to add and customize reports.
25.	The system must provide the ability to create new roles and modify existing ones depending on the customer's needs.
26.	The information system must allow the creation of user roles, setting different access rights to interfaces, functions (rights to create, edit, view, print reports and forms, etc.), without additional programming.
27.	The information system must provide the ability to set individual roles and access rights for a specific user or group of users.
28.	User interaction with the software must occur using a visual graphical user interface (GUI). The system interface should be clear and user-friendly, not overloaded with graphical elements, and ensure fast display of screen forms.
29.	Navigation elements should be user-friendly. Information editing tools should adhere to accepted rules for using functional keys, modes of operation, search, and window system usage. Input and viewing of data, reception of control commands, and display of results should be interactive. The interface should meet modern requirements and provide convenient access to the system's main functions and operations.
30.	All labels and user messages (except system messages) must be in Romanian.
31.	The system must ensure proper handling of emergency situations caused by user errors, incorrect format, or invalid input data. In such cases, the system must notify the user with an appropriate message, then return to the previous working state before the incorrect (invalid) command or input data.
32.	Screen forms must comply with standardization requirements: all user interface screen forms must be designed in a unified graphical layout, with the same arrangement of basic control and navigation elements; to describe typical operations, images of standard symbols, buttons, and interface elements should be used; External behavior of typical interface elements (response to mouse hover, button press, etc.) should be implemented consistently for similar elements.
33.	Documentation must be written in Romanian and provided in electronic format.
34.	End-user documentation must include descriptions of each system function, as well as the steps a system user should take to use that function. End-user documentation consists of: System Management; User Guide.
35.	The system must provide access to various groups of its functions according to user rights.

36.	The system must include the following subsystems (modules): Patient Registration Outpatient Inpatient Electronic Health Record Electronic Prescriptions Electronic Routing Instrumental Investigations Medical Imaging (PACS) Laboratory Inventory Management Financial Management Sick Leave Management Telemedicine Key Performance Indicators Statistics Patient Office Electronic Signature Marketing and External Notifications System Configuration System Administration.
37.	The system must automate the work of the outpatient department, diagnostic departments, reception department, and provide, among other functions, the following:
38.	Unique patient identification, after which medical documents are attached to the patient.
39.	The ability to create, edit, delete "Patient Registration Cards".
40.	Recording patient contact information, including addresses, phone numbers, and demographic data such as date of birth, time of birth, gender, and other information, stored and maintained for the purpose of unambiguous patient identification.
41.	Displaying patient key identifiers on all patient outputs
42.	Executing various queries by users to search for cards based on key card requisites
43.	Patient account for different categories of accounts
44.	Setting up schedules for doctors and rooms
45.	Managing the work schedule of institution specialists and patient service
46.	Booking patients for appointments with doctors according to the work schedule
47.	Searching for doctors and rooms in the system
48.	Recording citizen appeals
49.	Recording appointments via the medical portal
50.	Creating treatment plans and medical appointments
51.	Creating surveys
52.	Patient movement profile
53.	Conducting initial patient examinations
54.	Customize the appearance of your meetings
55.	Entering information about performed surgical interventions
56.	Maintaining a list of patient condition indicators
57.	Registration of laboratory/diagnostic procedures
58.	Ensuring automation of work with the operational base of medical images (PACS)
59.	Providing the ability to print on paper media the medical card of a hospitalized patient, as well as excerpts, certificates, discharge summaries, etc.
60.	Setting up and using document templates and medical phrase dictionaries for quick data

	entry with the ability to add new reports.
61.	The system must provide the planning and accounting process for consultative-diagnostic research results:
62.	Managing the work of the consultation-diagnostic center and patient service
63.	Planning the workday of each employee based on various criteria, such as fixed patient appointment times or selecting a general period for patient reception, etc.
64.	Booking appointments with doctors and diagnostics
65.	Setting up notifications, taking into account the wishes of doctors and patients
66.	Patient registration
67.	Issuing medical prescriptions
68.	Viewing research results, consultation
69.	Ability to input examination data (CT, MRI, ultrasound, etc.) and images directly from medical equipment, edit them, and include them in patient documents
70.	Generating and recording referrals for research and diagnostics
71.	Issuing referrals for hospitalization
72.	Recording the services provided to the patient
73.	Entering information about dispensary observation and conducting therapeutic and preventive measures
74.	Inputting information about vaccination and immunization
75.	Quick retrieval of patient information
76.	Generating accounting and reporting documentation, including: Ambulatory patient registration journal Visit tracking register "Ambulatory surgery record" journal Report on diseases registered in patients Activities of the outpatient clinic, dispensary, consultations "Endoscopic examinations" Registration journal for endoscopic examinations "Functional studies" "Functional studies registration" journal Journal of recording radiological examinations Registration journal for analyses and their results Registration journal for microbiological and parasitological studies
77.	Providing the ability to print outpatient cards, consultation data, etc. on paper media
78.	The subsystem must provide input and viewing of patient medical information, tracking doctor-patient interactions, controlling the course of the patient's illness, and generating various documentation, including:
79.	Maintaining electronic medical records (EMR) for patients, including both inpatient and outpatient records, instrumental and laboratory study results, appointment records, etc.
80.	EMR should contain: General patient information, including: Unique code (patient identifier) in the system Full name Demographic data Contact information

	Main patient documents Patient's affiliation to the Contingent group (in accordance with the requirements of the Ministry of Health when providing medical care) Key "signal" indicators (according to the requirements of the Ministry of Health) Additional (optional) parameters Signs of the patient's declaration history with family doctors Medical data about the patient, including: Patient immunization diagnoses Laboratory tests Diagnostic studies Prescribed medications Referral for examination Treatment referral Surgical interventions Pregnancy List of allergic reactions Results of inpatient treatment and discharge summary Additional factors affecting the patient's health Sick leave Other medical documents
81.	Customizing convenient medical document templates for physicians of any specialty
82.	Access security to EMR with consideration of user access rights to medical information approved in the healthcare facility
83.	Viewing patient EMRs and quickly finding necessary information in large volumes of medical documentation
84.	Generating, printing, and storing copies of these documents based on EMR
85.	Viewing medical data on patients: diagnoses, lists of diagnoses, etc.
86.	Ability to attach various documents to EMR
87.	Maintaining medication records
88.	Generating electronic prescriptions
89.	Tracking treatment orders. All prescriptions issued to the patient must be available in their EMR
90.	The system must provide the ability for the physician to generate and monitor patient referrals, including:
91.	Formulating referrals for investigations and diagnostics
92.	Receiving results for issued referrals
93.	Issuing referrals for hospitalization
94.	Receiving results for issued referrals based on hospitalization outcomes
95.	Referrals and results must be accessible in the patient's EMR
96.	The system must support the implementation of instrumental investigation processes and provide the following functions:
97.	Creating instrument investigation cards, generating investigation referrals
98.	Managing investigation scheduling
99.	After conducting the investigation and publishing it on the server, linking results to the instrument investigation card in the MIS
100.	Description of results of medical diagnostic investigation
101.	Physicians who referred patients for investigation should receive investigation results
102.	The system must integrate with the Robotic Medical Imaging System (PACS).

103.	The system must provide automatic input of investigation data in the international DICOM format, as well as manual input using electronic media in other formats.
104.	For Robotic Medical Imaging System (PACS), it must provide configuration and organization of medical image transfer to the image archive and perform the following functions:
105.	Working with the medical image database
106.	Automating the archiving, searching, and accessing of medical images
107.	Receiving and processing DICOM format data from X-ray devices
108.	Inserting characteristic images with labels and descriptions into an electronic document accessible from the patient's electronic medical record
109.	Supporting external and local PACS servers
110.	Previewing images before filling out the electronic medical record
111.	Printing documents with inserted images, tags, and comments
112.	Automation of laboratory processes in client laboratories
113.	Receiving orders for analysis, creating medical documents related to conducting analyses
114.	Issuing referrals for laboratory investigations, sending orders, generating and printing analysis referrals
115.	Organizing the collection of biological samples
116.	Facilitating the process of referral for analyses and obtaining analysis results by physicians who issued the referral
117.	Automating the preparation of samples for analysis according to investigation settings
118.	Inputting data into database systems with laboratory analyzers
119.	Preparation of work journals
120.	The system must include a built-in basic set of investigations, samples, containers, and units of measurement. The set of investigations should have tools for configuring the nomenclature of investigations and their properties in accordance with ISO 17025 requirements.
121.	The subsystem must be able to customize printed forms for issuing investigation results, including images.
122.	The system must be able to input reference values for laboratory investigations based on age, status, and other parameters.
123.	The system must facilitate real-time information exchange with automated analyzers and provide instant access to completed results for physicians, nurses, etc.
124.	The system must automate inventory management and perform functions such as:
125.	Supplier representation
126.	Contract management with suppliers
127.	Configuration of warehouse premises
128.	Ordering, receipt, return, internal transfers, and write-off of inventory
129.	Warehouse management (inventory management, automatic expiration date control, inventory)
130.	Establishing norms for the use of inventory for each service
131.	Ability to group medications by selected parameters
132.	Preparation of reports on consumed materials

133.	The system must automate the provision of paid services and perform functions such as:
134.	Counterparty management
135.	Defining services provided on a paid basis
136.	Price list management
137.	Recording of rendered services
138.	Generation of financial reports
139.	Synchronization with the accounting system
140.	Issuing sick leave certificates with specified numbers, series, issue dates, expiration dates, ICD-10 diagnoses, reasons for incapacity, treatment regimes, etc.
141.	Control of the uniqueness of sick leave numbers (series)
142.	Continuing previously created medical lists with indications of new treatment intervals and physician appointments
143.	Formation of a registry of issued sick leave certificates
144.	Conducting synchronous and asynchronous telemedicine consultations with patients and physicians, exchanging medical data with higher-level medical institutions, and providing the following functions:
145.	Forming a request for telemedicine consultation according to the primary accounting form
146.	Telemedicine consultation tracking
147.	Collection of telemetric data for assessing and monitoring the patient's condition, including physiological parameters, through remote measurement, collection, and transmission of information on the patient's activity indicators and physiological parameters
148.	Integration with hardware and software tools used for collecting telemetric indicators using sensors that record biometric parameters. The data obtained through telemetry are used for assessing and controlling the patient's condition and are transmitted to the patient's electronic medical record.
149.	The system provides the generation of summary information on key performance indicators and displays it in a convenient form:
150.	Analysis of institution's activities
151.	Control of data input
152.	Visual representation of employee workload and provided services
153.	Audit of medical documents
154.	Generation of operational and statistical reports necessary for managing the medical institution (e.g., reports on services provided, volumes of work performed, resource accounting, statistical reports on patient illness counts, analysis and planning of population healthcare needs, primary medical and sanitary care, etc.)
155.	Provision of customization options for the appearance and structure of output documents without the involvement of the supplier
156.	Receipt of reports in major common formats (HTML, PDF, MS Word, MS Excel, etc.)
157.	The system must provide patient's personal account functionality via web and mobile applications.
158.	Functionality through a web browser. Must support at least the latest version of the following browsers: Firefox, Internet Explorer, Chrome, Safari.
159.	Adaptive web design ensuring proper display of web pages regardless of device resolution and format.
160.	Functionality as a standalone mobile application for iOS and Android platforms.
161.	Patient registration on the Portal (with authentication options via Facebook, Google Plus, Twitter services)

162.	Provision of patient access to their medical information
163.	Appointment scheduling with a doctor
164.	Viewing consultation results, prescriptions, diagnostic conclusions, laboratory findings formed in the medical information system
165.	Evaluation of institution and physician performance
166.	Communication between doctor and patient through messages
167.	The system must provide visualization of physician lists via web and mobile applications.
168.	Functionality with a separate mobile application
169.	Displaying physician lists on the screen of visualization tools (phone, tablet, etc.) with information about physicians, days of the week, and appointment times
170.	Displaying individual physician's work schedule on the screen of visualization tools (phone, tablet, etc.) with physician's photo and available time slots
171.	The system must facilitate communication with patients by sending informational messages through various communication channels.
172.	Distribution can be automated or manual, initiated by the User.
173.	Creation of active distribution lists for the medical institution. Template configuration.
174.	Formulation of distribution rules (scheduled, event-based, etc.)
175.	Establishment of communication channels for each distribution (e-mail, SMS, messaging)
176.	Implementation of distribution based on configured settings
177.	Ability for users to populate data classifiers used for electronic card system fields, with a "Choose from list" type
178.	Ability to create additional fields for inputting information on existing cards, of the following types: text, number, date, time, text with text templates, attached files.
179.	Ability to create additional types of simple cards in the System, allowing users to edit, delete, and view cards of the new type.
180.	Ability to define specific logic for additional cards: validate entered field values, automatically populate fields based on others.
181.	Ability to create additional classifiers.
182.	Ability to create additional reports utilizing all data entered in the System, including in additional card fields.
183.	Configuration of electronic cards, ability to attach files, set maximum file size, and customize field names displayed to users.
184.	Configuration of card numbering rules, including templates for prefixes and suffixes, starting numbering values, and automatic reassignment of deleted card numbers.
185.	The system should allow the following actions for managing user information: create/delete users, edit their data, block user access to the system.
186.	The system should allow the following actions for managing user passwords: create a master password, change passwords.
187.	Ability to create user roles, combining different access rights to system functions (edit rights, view specific system cards, perform specific functions, print reports and forms).
188.	Ability to manage access rights to system functions by assigning roles to specific users (the same user can have multiple roles).
189.	Ability to categorize users by the institutions they work in, granting rights to access only their institution's data to each user.
190.	The system should allow the administrator to view the following logs: user login history, data access, report generation, user registration; error and unexpected program shutdown logs; electronic card creation/editing/viewing logs.

191.	Identification of users via electronic digital key.
192.	The system should ensure uninterrupted operation with scheduled technical breaks in the regulated procedures defined by the Customer.
193.	Stability of the medical information system should be ensured by a set of technical and methodological measures, including: backup of technical and software resources, use of uninterrupted power sources, organization of backup system components; creation of backup copies of information.
194.	Possibility to create a backup copy of the medical information database according to the Customer's reliability requirements.
195.	Transfer of software products to information media.
196.	Access to the specified medical information system for users should be provided using an organizational-technical solution for deploying a comprehensive information security system for medical institutions.
197.	Installation of software products on the customer's technical means.
198.	Import of all data from existing Medical Information Systems.
199.	Configuration and administration of the system.
200.	Staff training on using the system.
201.	Installation of systems for operation.
202.	Warranty support for software for 12 months from the date of delivery.