Proceedings of the International Conference IMCS-60, MSU
October 10–13, 2024, Chisinau, Republic of Moldova

Some Considerations on Medical Information Systems

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Abstract

The paper examines the practice of implementing medical IT systems, gaps in application, and some causes. Some considerations are presented on the IT system for the management of the health system, which would integrate all aspects of the operation according to the attributions of the actors in the field.

Keywords: Medical information system, national health registry, electronic medical record, electronic health record, interoperability.

1 Introduction

Medical information systems are intended to revolutionize the health system by reorienting medical care to the patient, providing the necessary information to the attending physician, the manager of the medical unit, as well as to other decision-makers in the medical structures, with the aim of providing safer, more qualitative, and more patient-oriented care, which would ensure the efficiency of the health system.

Information technologies in the field of health already have a history of achievements and failures, which makes us try to present a vision of the structure, content, and implementation methods for an effective and safe system that would satisfy both the actors of different levels of medicine (managers, doctors, nurses, etc.), as well as patients.

Since the field is extremely complex (hospitals, clinics, laboratories, state structures, etc.) and includes both the actual management of the

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entire health system and medical institutions, as well as the process of investigations, treatment, and monitoring of patients, it is clear that even with an impeccable structure and management, without credible, complete and up-to-date data sources, the decision-makers (doctors, managers at different levels) cannot ensure an adequate system operation process, the necessary treatment for patients, and monitoring the health status of chronically ill patients, young children, and elderly people.

The paper exposes some successful applications presented in the specialized literature and proposes a vision of the health information system and its structural components, which would include the integrated management of the system.

The article is structured as follows: in Section 2, some medical IT systems, databases, and electronic health registers implemented in institutions from different countries are described, highlighting the progress, but also some problems that persist in the medical field.

In Section 3, "Electronic medical records – component parts of medical information systems", it is advocated for the design and operation of health information systems based on electronic medical records (EMR) as the basic source of data about patients, diagnoses, prescriptions, and investigation results.

It is emphasized that the EMR is the initial data from which the patient's electronic health records (EHR) and patient information in the Repository are derived. In this way, the necessary data for the patient's treatment are ensured, regardless of the medical institution to which he addresses.

In Section 4, examples of medical IT applications from the Republic of Moldova are described and some problems influencing their implementation and operation are highlighted.

2 Medical IT systems: structure, requirements

The modern trends in the elaboration and development of medical information systems consist of a comprehensive understanding of the

management of the entire process, including such activities as investigations, treatment, and care of patients, including the elderly and those who require special care.

The Sustainable Development Goals adopted by 193 countries at the UN General Assembly in 2015, as well as the Political Declaration on Universal Health Coverage (UHC) adopted by the UN in 2019, state that strengthening the health system is the main means of achieving the common objective of accelerating actions for universal health coverage as well as eliminating inequalities in access to health, ensuring the entire spectrum of medical services from prevention to treatment and palliative care. A systemic approach to universal health coverage in the case of granting health as a priority human right can also have an effect on the fight against poverty, hunger, and disease.

According to the definition of the World Health Organization, a health system "consists of all organizations, people, and actions whose primary intention is to promote, restore or maintain health". Its goals are to improve health and health equity in ways that are responsive, financially equitable, and make the best or most efficient use of available resources [1].

The management of the system is intended to be more efficient and less expensive through interoperability and the exchange of data and information regarding the health of the population, by monitoring the operation of its components, providing qualified personnel, equipment, and drugs, and providing care at the state level.

We can basically distinguish five categories of actors and users of the health system, based on which a structure of the medical IT system can be outlined at the territory (but also state) level:

1. *Bodies* that have the task of establishing the policies in the field, evaluating the needs of medical services, and providing staff, resources, and infrastructures that would contribute to the achievement of the objectives of expanding access to health, prevention and treatment of diseases, and reduction of care costs;

2. The national medical insurance *company* (agency);

3. *Managers* of medical units (heads of hospitals, clinics, diagnostic laboratories) – to ensure the efficient operation of their institutions and personalized treatment with not excessive costs of quality care, of patients based on correct and safe analyzes and investigations and the necessary stocks of medicines;

4. *Clinicians* – professionals who work directly with patients exercising the task of diagnosing, organizing, and applying personalized treatment and patient care through the available means and the necessary drugs and subordinate staff;

5. *Patients* – to have the necessary information and to make decisions about their health care. Some studies [2, 3] show that many older people want to take advantage of the options and possibilities offered in countries in Europe and Asia, to be actively involved and make decisions about personal care.

Maintaining health with a population aging is a concern, with mobile technologies intended to remotely monitor real-time (MDP) vital signs and other physiological indicators and physical conditions of patients.

With few exceptions, monitoring applications are not found in eHealth systems.

Patient centricity, highly promoted in the last two decades, actually means that doctors consider the concrete patient when making decisions, with patients having a passive role.

Patient design is a newer concept in which patients are stakeholders and active participants in making decisions about their own health. This approach called "co-design" is a creative practice that aims to improve treatment.

Effective healthcare requires high costs, and the integration of information systems, which have already been implemented in the automation of certain services, requires radical changes in medical information systems. They are required to ensure the interaction and compatibility of systems that already work because, as a rule, they have been

designed and developed based on the institution's own needs without taking into account the need for data exchange within the entire health system.

For example, the reuse of data from some specialized healthcare registries operating in European countries is complicated, because understanding the adequacy of the data is often non-trivial due to the lack of detailed data catalogs with metadata. This is not simple work at all and requires an estimate of the software development options because perhaps it would be simpler to design the IT system in which interoperability and compliance with standards accepted at the European level will be ensured than to integrate the systems that on certain segments already work. Although there is steady progress in some countries, the application of information technology in healthcare in general is still fragmented and slow.

Thus, the report [4] "D4.5 Public database inventorying the national health databases and registries and describing their access procedures for reuse for research purposes" https://ecrin.org/news/public-database-inventorying-national-health-databases-and-registries provides an overview of national health databases and registries in 15 European countries: Austria, Czech Republic, France, Germany, Hungary, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, and Switzerland. It is noted that the "picture across Europe is diverse and at times patchy as the health databases and registries are subject to different governance and sustainability models but also to different local laws and access rules".

For example, in the Czech Republic, within the National Health Information System, a unified IT system operates at the national level, which processes data on the health status of the population, maintaining the National Health Registers. The system includes the units that offer health services with information about the volume and quality of the services offered, and the professionals they have.

In France, the National Health Data System (Système National des Données de Santé – SNDS) is managed by the National Health Insurance Fund for employees (Caisse Nationale de l'Assurance Maladie –

CNAM). CNAM is part of the "Régime Général" that deals with diseases (sickness, maternity, invalidity, death) and accidents/occupational diseases. SNDS aims to connect:

1. health insurance data (SNIIRAM database) which contains patient data, including age, sex, medical insurance, place of residence, diagnosis, disease and date of death, services reimbursed within the care provided, detailed coding (medicines, doctors' technical documents, medical devices, date of treatment) and the amounts reimbursed from the health insurance account and those paid by patients, etc.;
2. data about hospitals (PMSI database);
3. medical causes of death (database CépiDC Inserm);
4. data related to disabled people;
5. a sample of data from complementary health insurance organizations.

Data from SNIIRAM has been collected and organized gradually since 2002.

In Sweden, there are more than 100 national registers created for specific areas of the health system. Data about them are placed on the website Kvalitetsregister.se and contain information about all registers, contact details of the register holder, information about certification levels, and a link to the register's website. A relevant example is the Swedish National Stroke Register (Risk-Stroke) [http://www.riks-stroke.org] which was developed in 1994, and since 1998 the register has covered all hospitals in Sweden. The Risk-Stroke is used as a tool for continuous improvement of the quality of care after stroke.

"In 2016, the government developed a vision of Sweden as a world leader in e-health by 2025. Patients over the age of 16 can access their electronic health records to view personal health data, read doctor's notes, schedule visits, and update prescriptions". This is possible

thanks to a national patients' portal https://www.1177.se/en/other-languages/other-languages/.

The registers contain personal data regarding healthcare (diagnosis, treatment, and treatment outcome). An important role is also played by the Medicines Register, which ensures the increase of patient safety in the field of medicines. The register contains information about the patient (sex, age, place of registration), medicine (ATC code, name, concentration, packaging), prescription (e.g., quantity prescribed, dates of prescription and procurement), costs (cost and compensation), the doctor, and his specialty. The registers are financially supported by the Swedish government and the National Office of Quality Registers within the Swedish Association of Local and Regions Authorities (SKR).

Practically in each of the 15 European countries, the specialized registries are successful and demonstrate their usefulness, but they rarely have the tools to integrate them into the integrated data repositories (IDRs) which are designed as platforms for the integration of multiple data sources, including registries, through specialized analytical tools for the analysis, processing, and reuse of clinical data.

These examples confirm that without a systemic approach, it is impossible to create a comprehensive system that would ensure the optimal management of the health system taking into account all the elements of which it is composed. The goal is to optimize the overall outcome of the health system rather than optimizing its elements. This statement does not contradict the tendency to ensure the most efficient operation of each component.

The Republic of Korea is among the first countries that managed to develop and ensure the functionality of a system "National Health Insurance Service" (NHIS), which is the only insurer in the country since 2007 and has reached universal coverage of the entire population https://www.nhis.or.kr/english/wbeaa01100m01.do.

NHIS offers a Registration Service called "My Health Bank". Information is stored in one place. Individuals can log in to My Health Bank and then check their personal health records. It contains the results of health examinations accumulated over five years on health behaviors

such as smoking, physical activity, medical treatment, and prescribed medicines. In addition, childhood immunization records are registered with the Korean Centers for Disease Control and Prevention, so it is linked to that site.

Although it has been emphasized less, it remains very important that databases integrated into the medical data warehouse should be an important source for scientific research, to ensure new approaches and technologies in the treatment and care of the sick.

3 Electronic medical records – component parts of medical information systems

The use of electronic medical records (Electronic medical record – EMR) is generally accepted as a source of patient data, practically the digital equivalent of records of the patient's diagnosis, prescriptions, and investigation results, at the family doctor or in the clinical information system of the institution where his treatment has place. The EMR gives clinicians access to the complete treatment history included in the patient's medical record, medication history, laboratory test results, and preprocessed and archived medical images. The EHR is, like the EMR, a digital version of the patient record with a richer medical history. The main difference between EMR and EHR is that EHRs are designed to be shared with other authorized service providers who can access the patient's EHR from different healthcare providers.

Some countries have approved national policies and guidelines for introducing EMRs, and many hospitals are either already using or planning to implement them. Family doctors draw up the patient's EMR, and if the patient has arrived in clinics (hospitals) with only the traditional paper record, the EMR is drawn up with the entry of treatment data.

The EMR concept aims to eliminate paper records and drive essential changes integrated into the organizational structure, in the management of patient treatment, so that the data of the patient's investigations are accessible to the different institutions he calls without

repeating them, regardless of the place where they were performed. For this, EMRs from family doctors and after discharge from hospitals are sent to the data warehouse, thus completing and updating the data in the patient's electronic health record (EHR).

"A Clinical Data Repository (CDR) or Clinical Data Warehouse (CDW) is a real-time database that consolidates data from a variety of clinical sources to present a unified view of a single patient. It is optimized to allow clinicians to retrieve data for a single patient rather than to identify a population of patients with common characteristics or to facilitate the management of a specific clinical department. Typical data types which are often found within a CDR include: clinical laboratory test results, patient demographics, pharmacy information, radiology reports and images, pathology reports, hospital admission, discharge and transfer dates, ICD-9 codes, discharge summaries, and progress notes" [5, 6].

Thus, some changes have occurred in health activities that will generate an advanced culture in clinical issues, new roles will appear in health organizations. Functional, reliable, fully validated databases containing structured and unstructured data are the minimum requirement for the successful operation of the healthcare system.

The main objectives for the implementation of a secure medical data system must include a data warehouse that would integrate a set of specialized registers with data from source systems in real-time and able to process data flexibly, taking into account its heterogeneous nature. The data collected in the process of investigations and treatment are incorporated into the information system of the institution for internal use and are transmitted to the repository, according to the adopted regulation, for use in any medical institution to which the patient applies.

Among the issues that require resolution at the region or state level (in the case of smaller countries) is the degree of centralization of the repository: will it remain decentralized (distributed) in the units where data was created for each institution that is part of the national repository, or all databases and specialized registers are concentrated in the

national repository. Many practitioners observe that a universal solution, in some cases, can cause more problems than it promises to solve.

The solution is not obvious and in each particular case depends on the legislation, as well as, to a large extent, on the administrative decisions, which should result from the presence of qualified personnel in each medical unit and the available financial means.

Another issue is selecting which personal data from the EMR will remain in the patient's EHR. For example, the results of the admission and discharge analyses of the hospitalized patient would be sufficient, and only in specific cases would it be necessary to include some from the course of treatment. Domain expert physicians must decide which components will move from the EMR to the EHR and into the repository for use by any other healthcare actors to which the patient applies.

The purpose of the data warehouse is to provide each category of actors in the health system with the necessary truthful data (safe, current, standardized) according to their own needs:

- *clinical doctors* – with the current data and the patient's complete treatment history included in the medical records, evidence-based treatment solutions, alerting and informing the doctor about the progress of the planned treatment, avoiding errors, giving the patient the necessary time;

- *hospital (clinic) managers* – with data on staff, stock of medicines, patients under care;

- *managers of medical analysis laboratories* – with the flow of patients requesting each category of analysis;

- *the National House of Health* – data on insured citizens, medical sick leaves for institutions and enterprises depending on the nature of the illness and the patient's occupation;

- *territorial authorities (ministry)* – data necessary for management at the respective level;

- *researchers* – anonymized data.

The access of the actors listed above as well as others (if necessary) must be performed in a sanctioned and secure manner.

The repository must have tools that would monitor the status and history of all data processing and would ensure security, integrity, finding and accessing data, re-use, and accessibility for the term set by specialists for each category of users. It is important that the repository is patient-centered so that it can be used as a reliable source of truthful data for any medical institution that the patient may later apply in the process of treatment or recovery. This will save patients and the health system time, effort, and expenses. On the other hand, the repository has a special role in the interaction between the treatment and care system and the health insurance system, an interaction that ensures the correct financing of expenses, the monitoring of the correct application of medication, the payment of allowances for the period of incapacity for work of employees [7, 8, 9].

Ensuring the security and confidentiality of information is very important. Since for each unit in the medical system, ensuring the protection of medical data by dispersed services is too expensive, a common solution for the entire system would be more effective and safer. Even advanced countries in the application of IT systems in health are not exempt from the problems that arise due to security deficiencies.

An example is on 10 June 2024, when seven hospitals in London were subjected to a cyber attack, as a result of which they had to cancel or redirect non-urgent operations, tests, and procedures to other institutions in the public health system, and employees switched to working with paper records. Hospital officials estimated that it would take several months to remedy the situation. More recently, the July 2024 attacks on 17 US hospitals and other US healthcare providers disrupted patient treatment, but no other data has been announced.

In any cyber attack, loss of database integrity, or disturbances of normal operation, detecting the causes and finding solutions to protect against further attacks, and avoiding the loss of data from the data warehouse are imperative both for the operation of the healthcare system and for maintaining the trust of users (clinicians, hospital managers, patients, etc.) in the usefulness of information systems.

4 Development, completion, monitoring of data in medical IT systems

In recent years, digital technologies have continued to transform the economy and society, people's activities, and daily lives. At the heart of this transformation are data-driven innovations.

In a society where increasing amounts of data are generated, the way data is collected and used must meet certain rigors and data protection rules. In [10], it is stated that "The aim is to create a single European data space – a genuine single market for data, open to data from across the world – where personal as well as non-personal data, including sensitive business data, are secure and businesses also have easy access to an almost infinite amount of high-quality industrial data, boosting growth and creating value, while minimizing the human carbon and environmental footprint".

Europe aims to reap the benefits of better use of data, including increased productivity in all areas, competitive markets, transparent governance, convenient public services, and improved health and the environment. In [11], it is stated that "Personalised medicine will better respond to the patients' needs by enabling doctors to take data-enabled decisions. This will make it possible to tailor the right therapeutic strategy to the needs of the right person at the right time, and/or to determine the predisposition to disease and/or to deliver timely and targeted prevention."

Current health regulatory models are based on access to individual patient health data and expanding its use and reuse so that health authorities have a secure basis for decisions aimed at increasing the system's sustainability and efficiency. Citizens will have the right to access and verify their personal health data and request their portability, an aspect implemented only fragmentarily and not yet ensured by laws and regulations.

The progress of the implementation of information systems depends on the commitment of healthcare actors to ensure the use of data following the General Data Protection Regulation (GDPR), according to

which health data deserves specific protection. Although the GDPR has created fair conditions for the use of personal health data, the governance models for data access are different in different European countries.

Digital health services in different EU countries remain fragmented, although the European Commission has taken steps to strengthen citizens' access to health data and its portability. Article 40 of REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of April 27, 2016, on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/ 46/EC (General Data Protection Regulation) specifies that "In order for processing to be lawful, personal data should be processed on the basis of the consent of the data subject concerned or some other legitimate basis, laid down by law, either in this Regulation or in other Union or Member State law as referred to in this Regulation, ..." [12]. It establishes the Code of Conduct for the processing of personal data in the health sector. It is specified that any data transmission "may not be used for other purposes than those for which they were collected".

EHR development and health data interoperability are encouraged through the application of an Electronic Interchange Format of medical records. It facilitates the exchange of EMRs, medical images, patient laboratory results and electronic prescriptions between 22 EU states participating in The eHealth Digital Service Infrastructure (eHDSI).

The situation in the Republic of Moldova is a little different. Let's examine the example of the FORUM Clinic hospital. "Following the provisions of Law no. 133/2011 regarding the protection of personal data of the Republic of Moldova, the FORUM CLINIC hospital had the obligation to process personal data in safe conditions, for the general purposes specified in the context of providing the medical services you benefit from" [13]. It is noted that there is no automated decision-making process (including profiling) based on patients' personal data. FORUM CLINIC assumes responsibility and ensures security only for those information, personal data, and special categories of personal

data (health data; genetic data; if applicable, biometric data), which are provided and processed by their staff exclusively and through the combination of the following means: "in the security perimeter of FORUM CLINIC; in IT and/or electronic systems/tools/devices, hardware and software, clinic records and forms; within the work schedule of FORUM CLINIC". The clinic was not responsible for the processing carried out in any other form, apart from that approved by them [13].

The situation changes through Government Decision No. 282 of 04-27-2022 "Regarding the liquidation of the Registry for Evidence of personal data operators", but there is no clarity on the structure of the medical data registers and the responsibilities for their formation and maintenance (https://particip.gov.md/ru/document/stages/cu-privire-la-lichidarea-registrului-de-evidenta-al-operatorilor-de-date-cu-caracter-personal-si-abrogarea-unor-hotarari-ale-guvernului/9006).

5 Medical IT systems in the Republic of Moldova and some sustainability problems

The state informational resource of the Republic of Moldova that contains information about patients including provided medical services, prescriptions prescribed by doctors, administered medicines, etc. is the Medical Registry approved by the RM Government Decision no. 586 from July 24, 2017. The Registry includes automated information systems: Primary Medical Care, Hospital Medical Care, Blood Service, Transplant Agency "Transplant", Human Resources Record System in the health system, and Register of evidence of vaccination against COVID-19 from 01.05.2021.

Each information system in the Medical Registry represents a separate record system, which is implemented and put into operation by its holder.

Thus, the National Medical Insurance Company is responsible and filling in the data on primary medical care, hospital care, and the portal of medical leave certificates.

The decision establishes that the Registrars of the Medical Registry are: the Ministry of Health, Labor, and Social Protection; medical and pharmaceutical service providers; and other institutions in the field of health care.

Data recipients are the Ministry of Health, Labor, and Social Protection; National Agency for Public Health; National Medical Insurance Company; medical service providers; health subdivisions of local and central public administration authorities; Public Institution "Information Technology and Cyber Security Service"; the General Inspectorate of the Border Police.

It is stated that the owner of the Medical Registry is the state, the holder of the Medical Registry is the Ministry of Health, and the keepers of the information systems that form the Medical Registry are the National Medical Insurance Company, the National Agency for Public Health, the National Blood Transfusion Center, and the Transplant Agency.

From this enumeration, it is not possible to establish the procedures by which the data from the patients' medical files are collected and how they arrive in the component systems of the Medical Registry. The logic of the components of this Registry does not stimulate the structure of an information system, which to a certain extent would establish similarities with the advanced health systems implemented in Europe or South Korea.

In Moldova, there are several implementations of medical data and images from different sources, and many EMR systems are installed in both the private and public medical sectors. An example is the DICOM network (http://dicom.md/Account/Login?ReturnUrl=%2f), a distributed medical image preprocessing and archiving system. The DICOM network was launched in Moldova in 2012 with the aim of providing access to collected imaging data for medical staff with access rights and also access for patients when they need personal data. Today, the system is implemented in several hospitals in Moldova; it collects and processes more than 5 TB of data per month with different types of medical equipment [14]. Most of these systems contain

both medical data for the record of patients registered at these medical institutions and different types of medical image collections. The patient's personal data is the most sensitive and important information that should meet the main dimensions of data quality (completeness, correctness, timeliness, accessibility, compliance, etc.).

In the medical institutions of the Republic of Moldova, personal data are protected by the regulation of the National Center for the Protection of Personal Data of the Republic of Moldova, which is based on national legislation. In most hospital institutions, the internal standards or standard operating procedures for maintaining (https://scr.md/page/ro-proceduri-operaionale-269), the data are established from the patient record.

It is known that medical information systems can be secure and efficient, but they are highly dependent on the primary data based on which they operate and which contribute to clinical decision-making, planning, surveillance, and improvement of the health system.

Medical data includes both structured data from electronic medical records (EMR, EHR) and less structured data: ultrasonographic, radiographic images, etc.

An important problem for the quality of the collected data is the qualification and attitude of the personnel involved in entering data into the databases that are formed in the offices of family doctors, diagnostic laboratories, etc.

In many cases, in the tendency to report the implementation of IT systems, applications are proposed that have not been sufficiently tested and staff training has not been carried out in such a way as to be clear about the purpose and the method and to obtain professional skills.

These facts do not contribute to the popularization of computer systems – on the contrary, they harm the trust of users.

Perhaps the most requested, but also the one that often awakens patients' dissatisfaction, is the doctor's appointment.

Among the causes of user dissatisfaction are the interaction between the doctor and the IT system, through which the data on the doctor's

activity periods are not transmitted in time, the reliability of the network and the application, and the discomfort for the inexperienced user.

We will analyze the example of the implementation of an application, which has a future – the prescription of compensated drugs by doctors.

Initially, the transition to this service throughout the country aroused the dissatisfaction of doctors, who were not sufficiently familiar with the specifics of the application (with a possibly not very successful structure and interface), of patients who waited too long until the doctor was able to access the system and to find out that, for each prescribed drug, it is necessary to enter the patient's INDP (13 digits) every time, but also of the pharmacists, who were not sufficiently trained. With time, however, the difficulties diminished, and the medical staff acquired the necessary skills; it is proof that the application is currently used and appreciated, and yet the National Medical Insurance Company (NMIC) from the Republic of Moldova received 1,450 petitions in the first six months of 2024 with regard the difficulties in registering at the family doctor, insurance with compensated medicines or medical devices, accessing the portal of medical certificates, etc.

Officially, there are no opponents of the implementation of IT systems in medicine, but the experience of many countries shows that the process is too slow and there is a gap between acceptance and use that can be attributed to various bottlenecks at different levels of healthcare in the system, primarily the level of training of staff but also age.

There are different causes, and in each institution, specific moments can be found not only for the healthcare system in Moldova but also for other countries, namely: resistance to changing the way, the style, the appearance of new duties in data collection, in some cases the medical staff who used to make the entries in the paper forms, now, in addition, it also fills in the electronic form.

It is important that the information system is developed primarily based on the requirements and expectations of the end users and necessarily by actively working with the developers.

6 Conclusions

Healthcare IT systems have historically been built fragmentary for different needs; they use diverse technologies and systems that were not designed to communicate with each other, and inefficient data exchange hinders data integration and sharing. The lack of interoperability leads to duplication of efforts and hinders the creation of a unified patient record. These shortcomings are specific not only to the Republic of Moldova.

As more and more data are accumulated in IT systems and different systems become more connected and more vulnerable to cyber attacks, protecting patient data and ensuring confidentiality become paramount and critical, or its deficiencies can erode trust and disrupt services.

Robust security measures, regular audits and staff training on cyber security are required, as well as the adoption of standardized, encrypted protocols and interfaces.

Throughout Europe and other parts of the world, the effective use of ICT in the health sector has been less successful than in industry, services, and other sectors. Despite aspirations, it has been estimated that up to 50 percent of IT systems projects using EMR have failed [8, 15].

The experience of many countries demonstrates that the success of implementation depends on both the internal components (structure, capacities, and available resources) and the external ones (social, economic, and political environment) in which the medical system operates [16].

Depending on the strategic vision and resources (financial and time) the system can be designed based on the global goal, the generally accepted standards of interoperability, or the incorporation into the system of the applications that are already working by adapting them to ensure the exchange of data in the entire system.

It would be natural for changes to be carried out through an iterative, continuous process at organizational levels according to a program agreed with all actors.

Technology alone is not enough to guarantee that potential benefits (efficiency and quality of care) can be achieved if service planning and organizational process management do not motivate staff to change and adopt.

User involvement is important to ensure compliance with work processes, but the design of medical IT systems also requires an overall systemic vision to ensure the interoperability of components, and the implementation to ensure operation according to society's expectations.

South Korea's launch of a new electronic health record system is state-led and offers patients greater accessibility and control over their data, although security and privacy issues are still not fully resolved [17].

The adoption rate of electronic record systems in medical institutions in Korea is more than 90%, and the government has a goal of complete digital transformation in healthcare. It is worth emphasizing that compatibility issues between institutions are resolved, and all EHR personal health records are stored in the single application My Health-Way, which is part of a wider program MyData, where all citizens at birth are registered with an individual identifier for any medical, financial, and administrative activity in Korea through a single registration.

The solution we propose for the Republic of Moldova is to develop a tool similar to My Personal Health Bank, available in a web application to help citizens obtain and be able to verify data related to healthcare, including treatments, diagnoses, tests, medications, allergies, etc. but also any services provided by the government and local authorities.

The healthcare field is being improved through the implementation of new treatment technologies but also through new ways of collecting, storing, and using medical data and information. Providing the entire population with high-quality services is paramount, and the resources available to the health system in any country are limited. A possibility to benefit from data necessary for treatment, research, and management is offered by medical technologies EMR, EHR, and DW (Data Repositories) that already ensure the exchange of data between different medical units, although still limited in some territories.

A gratifying and promising example is the collaboration between Denmark, Finland, Iceland, Norway, Sweden, the Faroe Islands, Greenland, and Aland in the exchange of medical data and the joint use of DW, reducing costs for each country's purposes (management, research) [16].

In the Republic of Moldova, there is a small number of medical data registers, a fact that would make it easier to solve the problem of creating a national repository, with an operating mechanism similar to My HealthWay, but the current problems, taking into account the state of affairs in the health system and the country, would be easier to overcome by calling for a collaboration with some European countries in the style of the Nordic countries.

Acknowledgments. Project SIBIA – 011301, "Information systems based on Artificial Intelligence" has supported part of the research for this paper.

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