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Information System Management in Health Institutions of Kosovo: Case Study

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Abstract

Introduction: The main point in this paper is dedicated to the role and importance of the information system in public institutions with emphasis on health system: system preparation, establishment, implementation, and its application.Objective: The aim of this study is to increase the awareness and importance of health information system in health institutions and management and, to present a concept model of health information system to health institutions in Kosovo. Results: Presented Health Information System model shows the benefits and the role if implemented. The main aspects this concept takes in consideration is overall network, strategic flexibility and cost-reducing. Conclusion: This study highlights the benefits possible when new electronic health information system is fully integrated in health system of Kosovo. This case study illustrates the importance of developing new health information system that meets the actual challenges of health system, improve the system quality, usage and care quality.

Keywords: *Health Information System, Electronic Health Information System, Healthcare*

1. Introduction

Overall Social and Economic Development has raised the need for continuous information availability, in order to make successful managerial decisions, because everything is transitioning very fast. The fact that the continuous progress and growth of medical sciences, the diversity and harmonization of health activity, the high cost and investment in health, have conditioned a large amount of information in all areas of health, however they should definitely be in a fair and unique way to systematize, exploit and evolve. Developed countries in the world have long established a unique health information system, using all its benefits, while in our country this part of the work in the framework of health activity is left in the background. Although reforms have been greatly promoted and efforts have been made to restructure the health system in Kosovo, we still have no progress when it comes to the unique health information system (HIS). There is no coordination of a unique working methodology, system compatibility accounting, tools, compatible software support, unique communication system in setting unique health policy indicators on the basis of which are followed and orientations of the health status of a population fall. Health decision makers should know that a good information system, in future health activity, among other things, ensures quality in health care, rational presentation, efficient health care, reduces municipal costs, improves prevention, cure and provides evidence evolutionary work based on scientific facts. A unique program would support the health information system (HIS) which would connect all institutions in one center in order to provide and assist health care from the ministry to the municipal health level, regional health information insurance, primary health care and secondary, drug supply institutions, health - educational institutions, etc. This system would provide health information for all decision makers, as well as for the population and would actively involve them in the implementation (undertaking) of health protection measures, research of health phenomena in the population, improving efficiency and the labor economy in health, planning, programming and decision making in health activity, as well as scientific research.

1.1 Development and the Understanding of Health Information System (HIS): Promoting Health Information Technology in California – Reference System

Information processes are essentially conditional, starting from obtaining, processing, storage and the use of data. Information is presented as a social need and necessity for successful governance with objects or systems of different nature. Today an increasing number of enterprises have realized that without complete, accurate and relevant information there is no successful governance. Therefore, before giving a definition of information systems we will give some definitions of the notion of information. Information is neither a material nor energy, but in the system it conveys the material

and the energy. The material, is needed to transport and store it, while energy is needed to collect, process and transfer it. However, information is not subject to the laws of material and energy, because it is not spent on exploitation and is not reduced by sales. I.Turk says: "Information is governed and purposefully oriented to an address. (Ivan Turk: Building a business information system).

In this strategy the term of "Health Information Technology" refers to electronics systems to health care professionals and increasingly, patients who use it to store, exchange and analyze health information. Additionally, Health Information Technology is a mechanism of technologies and processes which help electronic generation, storage and transmission of medical information. This platform electronically stores all individual data about health history, enables communication between employees and health care units as well as electronic processing of prescriptions or laboratory test results.

According to the Legislative Analyst Office (2007) the federal system (Figure 1) is described as a process of the sharing of medical information by each participating health units, e.g., hospitals, regional hospitals, and local health units, laboratory, and stores the data pertaining to its patients on its separate computer systems. Further, health units are then connected by a computer network that allows its users to search for health data on each of the other systems through using patient indexing software and record locator software. However, this system allows each participating health facility to maintain different computer programs on its location as long as those programs are connected and interactive with each other.

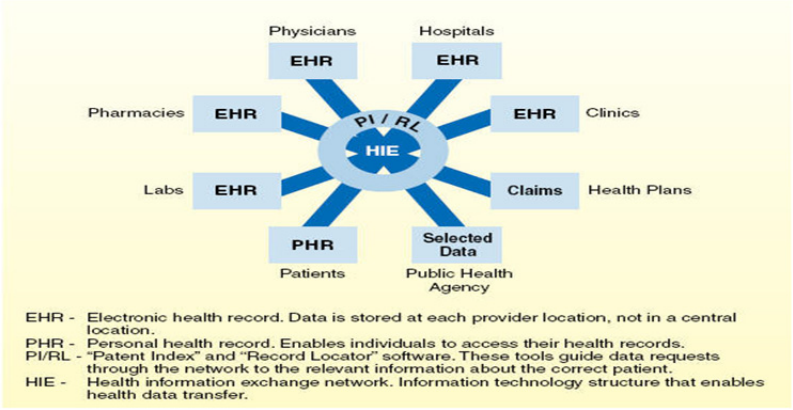

Figure 1: Regional Health Information Organization, Federated System Example. Legislative Analyst's Office (2007). A State Policy Approach: Promoting Health Information Technology in California. Regional Health Information Organization, Federated System Example. [Accessed 10/01/2019, https://lao.ca.gov/2007/health_info_tech/health_info_tech_021307.aspx]

2. Methods

2.1 The current situation of the functioning of the Information System in Health Institutions of Kosovo

The organization and functioning of the Information System in health institutions so far has been non-functional and as such has not been able to successfully perform information tasks.

It takes time to implement and fully integrate the health information system. Developments that have occurred in terms of the advancement of information technology, especially in the last decade, have made the information system in all institutions change from the concept of functionality. The health information system continues to be organized in a more classical form which means a chain that starts from primary health care, ambulances, health stations, health homes, secondary and tertiary health care, rehabilitation (hospitals), all of which are referred to Kosovo Institute of Public Health. Which was responsible for the health information system where it provided reports (quarterly, semi-annual, annual, statistical yearbook). The problem of applying a new system were primary derived by the rising health costs, health care lagging in information technology and the premises of technological advancement.

However, many of the proposed projects were for implementation during basic phases of establishing a health information system, where in some cases of health institutions it was necessary to develop the information system in low-cost and simultaneously with its separate systems in laboratories and pharmacies. Some of the key activities of the health system were not properly supported, such as the durability and ease of printing the material. Inefficient projects and implementation has left users dissatisfied all these years. Introducing key features of the system takes precedence over managerial reporting, thereby reducing immediate decision-making benefits. Failure to respond quickly to various malfunctions results in some Clinics / Hospitals computers not working for several days. Restricted access causes some of the employees / staff not to be able to log in to the system, which also leads to nonsense. The need to change the evaluation component to that of external control before and during the design is necessary, as the system had to be implemented as soon as possible in all clinics. The same system currently does not perform the efficient function, therefore the definition for another more advanced form of HIS (health information system), is necessary in order to advance the health services, proposing a more advanced program for all clinics, for what needs to contract experts for the implementation of this project. In the two clinics we monitored where the system was installed, a marked change was observed in the field of the analyzed variables of quantitative outcomes (mean time of outpatients, length of stay, number of drugs prescribed per patient, improved participation collection, case price and number of deliveries from other centers).

The functioning of the health information system which has mainly covered a part of the health services with a limited access as can be seen in figure 1:

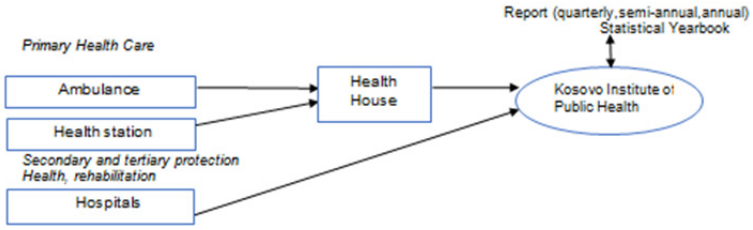

Figure 2: Data collection by units

From what we have encountered as part of the data for HIS, Primary Health Care is mainly concerned with: health services, staff, morbidity (diagnoses), number and type of health services, type of health insurance, medical leave.

While in Hospitals the following data have been collected: such as health services, staff, morbidity, mortality, health capacity, type of health services. In addition to those mentioned above, data were collected from other sectors such as: occupational medicine, public health, immunization, air pollution, water and food and demographic data such as water supply and sewage network, etc. While data on the use of / Expenditures of drugs in the health system have not been collected (although there has been a tendency).

The role of the Kosovo Institute of Public Health (KIPH) in HIS in the previous period was: Collection, inclusion control and quality control of data;

- Data processing;
- Reporting towards higher levels;
- Publication of the Statistical Yearbook for population health;
- Analysis and proposal for problem solving (based on the requests and needs of the executive bodies - Ministry of Health, Health Insurance, etc.)
- For professional and scientific needs (specializations, dissertations, symposia, congresses).

2.2 Health Information System Development and Perspective in Kosovo

All information systems should be based on a clear information strategy, identifying information priorities and needs at each level of the organization. Based on this the system should best suit the identified information needs of the services. Many systems are implemented in which case after implementation they are not used properly, because they do not provide the specific information that a particular service need. Different management structures, cultures, competencies and organizational priorities

should be taken into account when choosing the appropriate information systems. It is the managerial responsibility of the Ministry of Health, to lead this process and to engage the key parts of the services: hospitals, family medicine, etc. It is the managerial responsibility of each part of the services to determine the information needed for efficient management, and it is also the responsibility of the hospitals / clinics to determine the information needed to effectively manage the diagnoses, care and treatment of their patients. Possession of information, administration and circulation of information should always be clearly defined and this is the responsibility of the management of the Hospitals and the ministry. Managerial responsibility for accuracy, ease and adaptability should be included in the job description of the corresponding individuals, as is the provision of accurate information. In order to enable the management of Kosovo health institutions to make reasonable decisions on service planning, it is necessary to create a new information system. For the benefit of the people of Kosovo, for which it is necessary to have an accurate and standard system of high quality, for data collection on the needs of health institutions. All Clinics must place special forms according to the services performed and the same to be registered in the computer. Comply with the content of the forms that must be submitted for the registration of data from diagnostics and activities in operating rooms and ensure that the necessary training and technical support for all are followed.

2.3 Reference system

Major improvements will not be for a short time, and will not be achieved only by the UCCK (University Clinical Center of Kosovo). Some strategies can be taken at the level of UCCK, others at the level of the Ministry. The Ministry of Health in cooperation with UCCK, should limit the number of patients that will be checked within a day and in cooperation with UCCK should start implementing the standard system of pre-arranged visits. The Ministry, in cooperation with other actors, should continue to train staff in primary and secondary care and provide incentives for their stay in peripheral areas by limiting the number of referrals from other health centers and regional hospitals sent to the UCCK. Competent institutions in this process should also consider including some form of potential strategy that should include rewards for general practice to encourage them to act as true advocates. Distinguishing different types of referrals, specialist consultations; for example, referral for opinion, referral for relevant services and referral for taking total responsibility for patient treatment. This should be part of improving communication between low referral and high referral. Reinforcement of referral guidelines (e.g. adjusting numbers and imposing penalties for over-referrals). This will indicate which patients should be referred (appropriate referrals) and further research into the reasons why health homes are referring high number of patients. A public information campaign will encourage a change in the attitude of staff and patients. The Institute of Public Health, with the support of local health directorates,

could lead these types of campaigns. As part of the information campaign, improving communication between the UCCK and other regional hospitals would have a mean, as well as improving communication between the UCCK and its patients. Therefore, encouraging a better information system would increase the possibility of efficiency of services not only in activities with patients but also in all other follow-up services through which the referral system would be improved. Since the most appropriate referral models will come from clear improvements in primary and secondary services in Kosovo. In Figure 3 you can see the collection of data which will be used for the preparation of various reports and analyzes by all health institutions.

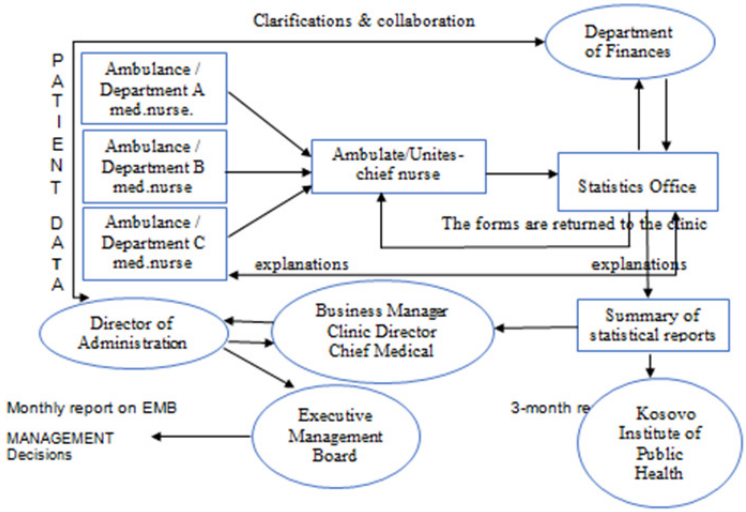

Figure 3: Data collection on patient activity and reporting flow

3. Results

3.1 The concept of new HIS Model in health institutions of Kosovo

Further progress needs to be made by all related parties to advance the capacity and structure of the health care system in relation to the construction of the Electronic Health Information Network. Further progress needs to be made by all related actors to advance the capacity and structure of the health care system in relation to the construction of the Electronic Health Information Network:

- Strengthen the legal infrastructure and human resource training by explaining the current stages of the Health Information System.
- Improving the referral system from Regional Hospitals to UCCK through Telecommunications training and continuing professional development programs.

- Monitoring and testing the technical performance of the infrastructure.
- Integration of the National Telemedicine Center in the Health Information System network in the field of health economics.

The reflection of the strategies of the Ministry of Health, for the reforms and the improvement of the quality of services in the field of health care, of the existing and feasible results in the future. It should be based on the performance of informing the health indicators in order to maximize the sustainability and continuity of investments in health information system, through regular reporting and monitoring of the current situation and directions of development of human resource skills in the future. In order to optimize the risk / benefit relationships in all stages and areas of management for integration and definition of a system architecture we must also consider:

- Decentralization of authority towards the municipal level,
- Sectorial cooperation and intersectorial cooperation
- Community participation in health services and,
- Budget

In Figure 4, the scheme of functioning and organization is presented eliminating the raised dilemmas that; as well as by whom all data will be collected.

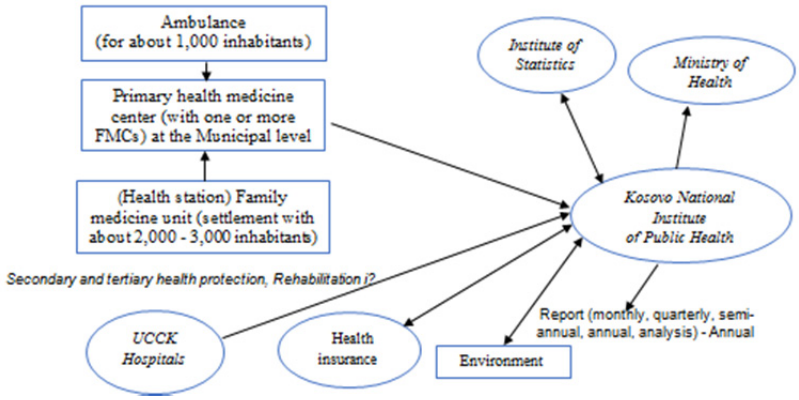

Figure 4: Organizational chart which shows which data will be collected, who, how, when will be collected, and to whom are they dedicated?

The minimum statistical data to be collected by HIS according to the above scheme would be the answer to the following questions: What to collect and how, and where the data comes from, how it is analyzed and who did it, how it is derived, and from who was used, who collects the data and by whom they are collected, what data they collect, in what form they are, were they used at the local level, when the data was collected, how often it is reported and how much is reacted based on them, where the data was sent are they first analyzed at the municipal level before moving to higher levels, why is

the data collected, why the collector needs to justify himself; At the request of the director or decision maker at the highest level, how the data / information is transformed into a concrete health action.

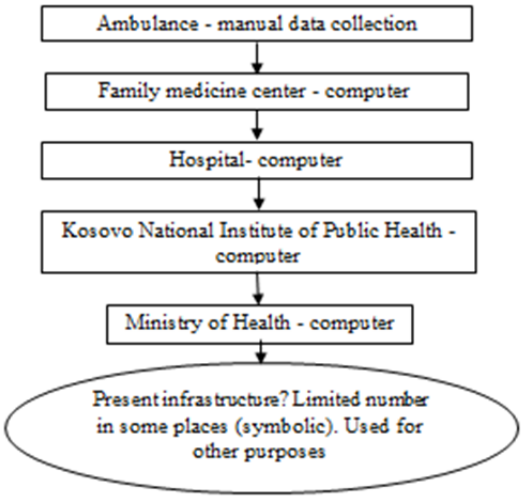

Figure 5: Development of skills and knowledge of the decision-making staff at different levels for the collection, flow, interpretation and utilization of information.

Currently a small number of persons have managerial expertise at the municipal level. This makes it difficult to identify and determine the needs of people locally for the type and other elements of information they need to have. It also limits and disables the analysis and practical use of information. This conditions a dependence of expertise from outside the institutions.

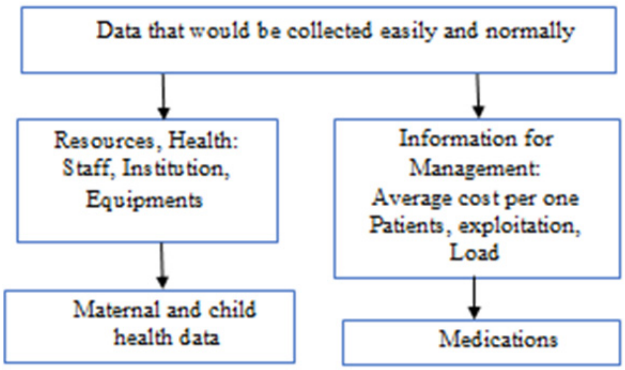

Figure 6: Data collection / information scenarios

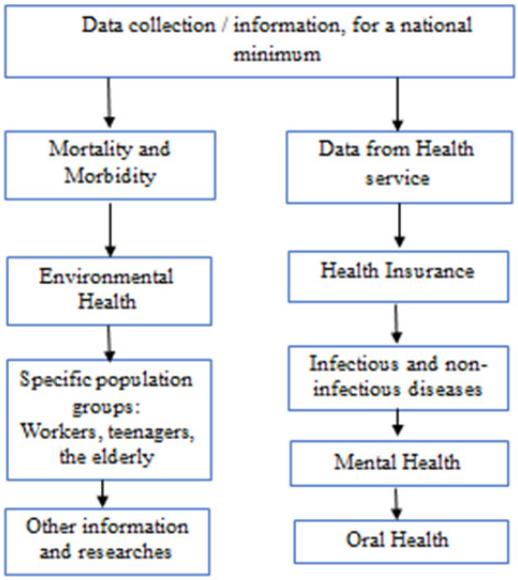

Figure 7: Data collection - Proposal for the minimum at the National level

4. Discussion

4.1 Importance of developing new HIS models

Based on the information system and the research done, different alternatives for investments or new reforms can be presented, whether they are in the information system or in projects related to developments in other areas. By selection a group of possible alternatives is obtained where the purpose of this selection is to remove in the first step from further consideration of all alternatives that are not in line with the intended goals and are unlikely to be successful. Pre-investment analysis is the first step in investment management, because it serves to determine investment ideas. This means that no investment is presented by itself but that a preparation of them must be made first. The identification of investment projects starts from possible investment ideas, where the ideas usually have their source in development policy and investment policy. We will have good ideas only if we have well defined development strategy. If there is no development strategy then there can be no question of successful investment projects. The future is uncertain and mistakes are possible. This stems from the fact that when deciding on investments the data on the past, mostly serve for decision making, the effects of which are expected in the future. Therefore, to be successful in investing we need to think about what we expect to happen. We know what happened, but the past may or may not be repeated. However, the future is uncertain so it is reasonable to evaluate the efficiency of investment placement.

Evaluating the efficiency of investment placement means a set of activities which aim to examine its reasonableness. This means that proposing an application and making investment decisions also includes economic evaluation where costs are compared to profit (effects). "Expenditures can be estimated accurately, but the effects are difficult to measure." Once such assessments are made, economic efficiency can also be calculated. For example, the payback period can be reviewed. The evaluation of the efficiency of the investment project is a specification of data from the entire investment study. For this purpose, the expression is made through indicators which express the efficiency and effectiveness of the project. The evaluation of the efficiency of the investment project aims to derive the efficiency indicators on which the investor relies during the final decision. This system should include: Services, Network Design, Networking, Networking in Detail, Backbone - Object Connection, Networking Applications, Services, Help Desk (HIS Rapid Interventions), Workshop (Office within SISH where quick interventions are made - replacement of computer parts, etc.), increase of capacities as needed (new computers to be connected to the system: physically and software), technical support for internet (for internet use for those who do not have experience). Standardization of the information system and compilation of the action line (Internet & Intranet use Policy), Preparation of a detailed plan for the new Information System in general, Evaluation of HIS requirements for a unique database software for the future:

E.g.: Patient registration, Billing, Warehousing, IT equipment, Doctors, organization of on-demand trainings, connection with other hospitals (internal services: FTP, access to documentation, servers - intranets, etc.). The computer network that would be installed in each institution consists of a certain number of computers and other network equipment (printers, scanners, etc.).

The network is used for electronic mail (e-mail), data transfer, as well as for eventual access to another computer via the Internet in another location or for interactive follow-up of events (telemedicine, hospital board meetings via multimedia web camera, high-screen). Today's development of IT (information technology) of various companies and organizations includes the security of sensitive data of companies. The use of the network will also develop the use of new software applications and communication technology as well as data storage. The importance of the Intranet is considered a priority in all world organizations and companies. Applying and using the rules of international telecommunications organizations (TIA / EIA, IEEE, BNI) increases work efficiency.

Computer networking is essential in integrating information technology and digital information into the use of computer systems.

4.2 Benefiting from network

Benefits in communication in general, Coordination and internal communication,

shortening of time and potential up to 80% affects productivity and shortens the time for:

40% of working time in document processing
40% of working time for communication

4.3 Strategic flexibility

Energetic growth of dialogue and access to information and allocation of knowledge resources.

- Productivity (Randell R, et al. 2007; Chaudhry B, et al. 2006; Balas et al. 2004;)
- Easy, fast and flexible communication, dialogues: One-on-one, much-more-more. (van der Kam WJ, et al. 2000; Georgiou A, et al. 2007)
- Productive cooperation (Bryan C, et al. 2008)

Possibility to use various media without limit of geographical borders. Possibility of limiting internet access and intranet data according to importance and hierarchy, use of the Internet for teaching in different professions, development, distribution and application of intellectual capital as well as sufficient free and paid training resources.

4.4 Cost Reducing

In addition to reducing expenses for meetings, traveling and telephone conversation time, reducing printing and distribution costs, due to the development of the information system. We will also have many benefits that consist of fairer budget planning for medium-term periods of interest to Health Institutions by reducing unnecessary costs, but not only that. Starting from the current moment of contemporary social and economic development, currently the Kosovar society and all institutions are at the stage when they are making efforts to organize the management information system, and its role is very necessary for the organization and the function (Niès J, et al, 2006) of health institutions, in other words in rationalizing and increasing its efficiency (Jackson TL. et al. 2006; Urquhart C, et.al) , both by reducing costs (Balas EA, et al, 1996; Kramer et al. 2003; Dorr D et al. 2007) and decision-making time that we witnessed during the pandemic "Covid-19".

5. Conclusion and Recommendations

The role and importance of the information system is related to the processing and delivery of information to their places of use, thus enabling the monitoring of the process of preparation, receipt and implementation of decisions. This is where the importance and necessity of applying the information system lies. Overall Social and Economic Development has raised the need for continuous information availability to make successful managerial decisions because change is happening very fast. The fact of

advancement and continuous growth of medical sciences, diversity and harmonization of health activity, high cost and storage price, have conditioned a large amount of information in all health subjects, however they definitely need to be rightly and uniquely systematized, exploited, and evolved. By health information system we mean the mechanism of collection, processing, analysis and receipt of information necessary for the organization of health protection, scientific and medical research. To achieve this, mechanisms, methods, people and machines are needed, which together form the system through which information is processed. Today, this elaboration represents not only a suitable ground for decision-making, but it can be rightly said that he who has information, also has knowledge and managerial power. Developed countries in the world have long established a unique health information system, using all its benefits, while in our country this part of the work in the framework of health activity is left in the background. In the future, the importance of the information system in health institutions will be very prominent, even for current and future development trends, and it will be a limiting factor of development in the modern economy. Based on the current development trends and the need of businesses for their most successful development, the affirmation of the need for organization and functioning of the information system is very necessary both at the national level and at the level of health institutions, especially in UCCK (University Clinical Center of Kosovo). Both the organization and functioning of the health information system within the UCCK and its future development requires first acquaintance with the organizational structure of functional units within the UCCK and of course their follow-up with the very important part of the health management system. Each system in its functioning has its own difficulties and advantages in organization and functioning. Therefore, the future model will aim to minimize the difficulties in the functioning of the system and to adapt it to the highest possible extent to the needs of the management, presenting their products as essential for an effective and active health system. Mistakes that may occur during the implementation of the H.I.S. may be repeated until the unique nature of health information system is understood and a regular assessment is established for all, from the outset. Implementation weaknesses often result in failed aspirations by dedicated information technology personnel, health managers, and other professionals. Most demoralizing, however, may be the loss of initial investment. Many countries have gone through difficult and often depressing phases in terms of building the Health Information System including the UK which has poured in millions and applied various disciplinary measures to build S.I.SH. Most authors see the definition of information system as an organized whole of its elements and a formalized part of the communication system of a particular organizational unit, which consists of units and machines that generate, or use information and establish communicative relationships with purpose of realization of information processes. Therefore, we can conclude that the information system is a functional link in the process of collecting, processing, transmitting, using and storing data and information through electronic data processing systems.

The purpose of the information system is to process, store and transmit the right information in the right place, and the best information system is the one that performs this function as quickly and inexpensive as possible.

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