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## HEALTHCARE INFORMATION SYSTEMS AND THE HEALTHCARE PROFESSIONAL'S ROLE

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### ABSTRACT

A review is made of sources to show phases in development of a healthcare information system. More healthcare professionals use the IT technology in their practice. The purpose of the article is to familiarize healthcare professionals with the phases of developing an information system. Medical specialists in particular area can demonstrate their knowledge in the field of IT technologies by participating in the development of an information system.

Key words: healthcare information system, technology, medical specialists, IT specialists

### PURPOSE

The purpose of this paper is to examine development phases of an information system in the medicine and healthcare area. Independently of the new legal requirements or because of the necessity of organizing their practice most effectively, Bulgarian medical doctors gradually began to use computers with specialized software.

### INTRODUCTION

Regulatory requirements in health care raise the demand for all medical specialists to report their activities on electronic media. This stimulates already increased interest in software packages for the purposes of medical practice.

In the area of healthcare, frequently used terms are (1):

- **Patient** – any person who receives medical attention, care, or treatment.
- **Paper Record Of the Patient (PROP)** – generalized concept for the aggregate of all medical documents, created during the visit of a patient with a doctor or other

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- healthcare professionals or a hospital (Personal Ambulatory Card (PAC), Case History (CH), medical documents from the laboratories, etc).
- **Electronic Medical Record (EMR)** – electronic version of the paper medical documents
- **E-health** is a term for healthcare practice supported by electronic processes and communication (2).

Advantages of PROP:

- Its use does not require special knowledge and training,
- Easily carried,
- Allows free expression of the physician opinion,
- Easily reviewed.

Disadvantages of PROP:

- Unclear written notes,
- Badly ordered notes, missing data,
- The static record,
- The record is not always available if it is needed,
- Could be used by one specialist at a time,
- It is just one view upon the data,
- Could be lost and data retrieval will be very difficult,
- It has some difficulties to use it for scientific purposes,
- Difficult processed by computer.

Advantages of EMR:

- Permanent on line access,
- Complete multimedia medical records,
- Availability,
- The way to reduce costs for paper, storing, indexing and distribution of the records,
- Clarity and readability,
- Decrease in negligence, errors and redundant data,
- Possibility of presenting the data according to the user requirements and willingness,
- Better organization in compliance with unified structure (standard screen forms),
- Automatic verification of data validity in the import process,
- Assistance in decision making, generating warnings and advices,
- Good base for analysis, clinical and epidemiological studies.

Disadvantages of EMR:

- High initial costs,
- Sudden crash and lack of possibility to use the computers,
- Required special training for use,
- Insufficient protection and security of the medical data,
- Difficulties in entering data in EMR.

The above differences between PROP and EMR are the main reasons for use of healthcare information systems. Health information system is a system that integrates data collection, processing, reporting, and use of the information necessary for improving health service effectiveness and efficiency through better management at all levels of health services (3).

The basic requirements for development and implementation of a health information system are:

- To support for short-term and long-term planning of resources,
- To support for tracking activities from medical, administration and financial point of view,
- To decrease in the price of health care services,
- To support for obtaining an adequate payment for health care and medical treatment,
- To improve and streamline the quality of medical, administrative and financial information,
- To store patient information in one place,

- To improve and streamline the patients service,
- To improve the work in the area of health care,
- To increase job satisfaction of the staff.

The healthcare systems have to be with simple and convenient interface could be easily updated and expanded by users themselves without much intervention of IT specialists. Of course, it have to be guarantee the data confidence from destruction and unauthorized access. Some of the more important aspects of data confidence are: Accuracy, Timeliness, Availability, Precision, Reliable source, Definition of data, Speed of access, Time variance, Data presentation, Granularity, Security if needed, Moment of capture of the data (4).

Too often, tuning begins when an application's development is already finished. This is unfortunate because it implies that performance is not as important as other crucial requirements of the application (5). Performance is not merely optional, though; it is a key property of an application.

To achieve the final goal software developers must have done well presented objectives and developed phases in the level of system development. This will avoid the intervention of an IT specialist in the use and update of the system and will provide an active participation of medical specialists in this area for better result.

Essential phases in information system development are:

1. Requirements analysis
2. Analysis and design
3. Coding and unit testing
4. Integration and acceptance testing

If it is thought carefully about the tasks to carry out for each of these phases, it may notice that performance is inherent to each of them. In spite of this, real development teams quite often forget about performance, at least until performance problems arise. At this point, it may be too late. Therefore, it is important to develop all phases consistently and correctly. In the first phase "requirements analysis" both the specialists in specific area and the software engineers take part.

As with any onset, setting a sound base in the first phase is most important to implement the

next phases. Discovery of errors in any of the following phases most often returns to the first. A requirements analysis defines the aim of an application and therefore what it is expected to achieve. To do requirements analysis, it is quite common to interview several stakeholders. This is necessary because it is unlikely that only one person can define all the business and technical requirements. Since requirements come from several sources, they must be carefully analyzed, especially to find out whether they potentially conflict. It is crucial when performing a requirements analysis to not only focus on the functionalities the application has to provide but also to carefully define the utilization of them. For each specific function, it is essential to know how many users are expected to interact with it, how often they are expected to use it, and what the expected response time is for one usage. In other words, it must define the expected performance figures.

### CONCLUSIONS

Strategy for implementation e-health in Bulgaria was passed in 2006. The objective is the e-health condition improvement and the quality of life of Bulgarian citizens through securing equitable access to modern, effective

and quality healthcare services with help of existing and new technological resources, in accordance with changing necessities and an increased mobility of population. To achieve convenient, simple and reliable healthcare information system the active participation of medical specialists during design and development in all phases is necessary to achieve quality final product.

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