Information management in healthcare organizations

Managementul informaţiei în organizaţiile din domeniul sănătăţii

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Abstract

The health care industry is currently experiencing numerous fundamental changes. Healthcare organizations (HCOs) are increasingly challenged to look at their operations and find new opportunities to reorganize their processes, in order to improve the efficiency and effectiveness of their services, reduce costs, be more competitive, and also provide high quality and more personalized patient care. This new business strategy requires HCOs to implement new Information and Communication Technologies, such as Internet applications, enterprise information systems, and mobile technologies, in order to achieve their desired business changes and results, mainly through better information management methods and techniques. Based on these perspectives, this article aims to initially define and discuss the key challenges and opportunities for promoting high quality and cost effective care in HCOs. It describes the fundamental and important aspects of information management, as well as the technology drivers that aim to improve the generation and flow of health information within HCOs.

Keywords: *information technologies, management, healthcare organizations*

Rezumat

Domeniul sănătăţii trece în momentul de faţă printr-o serie de schimbări fundamentale. Organizaţiile din domeniul sănătăţii se confruntă din ce în ce mai mult cu noile metode de reorganizare a proceselor, pentru a creşte eficienţa şi eficacitatea serviciilor oferite, pentru a reduce costurile, a fi mai competitive şi pentru a furniza servicii personalizate de înaltă calitate. Noile strategii de afaceri presupun ca organizaţiile din domeniul sănătăţii să implementeze soluţii bazate pe noile tehnologii informatice şi de comunicaţie (aplicaţiile Internet, sistemele ERP, tehnologiile mobile), pentru a atinge rezultatele dorite, în principal printr-un metode şi tehnici îmbunătăţite de management informaţional. Prezentul articolul are scopul de a prezenta provocările cheie şi oportunităţile pentru promovarea unor servicii medicale de calitate şi eficente în cadrul

organizaţiilor din domeniul îngrijirii sănătăţii. Sunt descrise aspectele fundamentale ale managementului informaţiei, precum şi metodele tehnologice care pot să îmbunătăţească generarea şi fluxul de informaţii din cadrul organizaţiilor din domeniul sănătăţii.

Cuvinte-cheie: *tehnologii informatice, management, organizaţii din domeniul sănătăţii*

JEL Classification: I10, M15

Introduction

The healthcare systems in many nations around the world are facing nowadays significant challenges and fundamental changes in the delivery of healthcare services to their citizens, even if the nature and scale of each system varies significantly between industrialized and developed countries. Most of the challenges are universal and the ones that have the greatest impact on healthcare organizations (HCOs) are:

▪ The increasing demand for health and social services, due to the rise in the proportion of the elderly people requiring care. According to research evidence, by 2051 close to 40% of the European Union's population will be older than 65 years old (Braun et al., 2003)

▪ The increasing expectations of citizens for reduction of inequalities, access to quality-assured and evidence-based care services

▪ The complexity of caring for people with acute and chronic disease problems

▪ The requirement to limit healthcare costs and to optimize resource utilization, while providing the best possible healthcare under limited budgetary conditions

▪ The need to reduce the unacceptable rates of medical errors and their significant impact on patient safety

▪ The increasing mobility of patients

▪ The apparent need to manage the enormous amounts of health information that need to be accessible in a timely manner, at different locations, at the point of need, both for clinical and administrative purposes.

Inevitably, all of these factors have influenced significantly over the years the healthcare industry and particularly the ways in which healthcare organizations operate. This argument is supported by the fact that many healthcare organisations appear today to be trying increasingly to re-organize their processes and improve the effectiveness and efficiency of their services, in order to be more competitive and reduce their costs, while also ensuring the provision of better and more personalized patient care. Information is considered to be a valuable resource and a vital element in this drive for efficiency and effectiveness. Therefore, the key challenge and opportunity for policy makers and healthcare professionals in our days is to find new ways to harness information, in order to improve the delivery of care and to balance the costs (Norris, 2002).

Healthcare organizations, just like other business entities, are information-intensive enterprises, generating on a daily basis huge volumes of data from many different units such as clinics, laboratories, surgeries, administrative offices, and so on. Yet, much of

this data continues even today to be processed manually is spite of decades of experience in the successful application of Information Technology (IT) in other information-intensive industries.

At the same time, the health care industry has become significantly specialized and complex. Complexity, on one hand, arises from the numerous entities, which are simultaneously involved in many interactions and processes during the provision of patient care (e.g hospitals, individual physician and specialty practices, pharmaceutical companies, insurance companies, etc). While, on the other hand, specialization occurs due to the significant and continuous advances that take place in the field of medicine such as the development of new treatments, diagnostic plans and procedures.

Within this interdisciplinary healthcare environment, it is commonly accepted that the safe and high quality delivery of healthcare services depends heavily on timely access to accurate and comprehensive information, as well as knowledge resources. Thereby, over the years, *information management* in HCOs and its environs has emerged from a secondary to a primary subject of institutional management, constituting a critical component in the process of successful healthcare delivery.

Many business analysts, as well as scientists, have emphasized over the years the need to treat information as a valuable resource, which has an important role to play not only in the successful operation of an entire HCO, but also in delivering value to its stakeholders (e.g. patients, professionals, government authorities, etc.). This also suggests the necessity for the development of specific responsibilities, strategies, and tools, in order to manage information resources effectively and improve their quality to deliver value. Therefore, HCOs are turning increasingly towards the adoption of new techniques and processes that can support more efficiently their working environment and the services they offer.

Current use of ICT in healthcare organizations

Many observers cite HCOs as being slow so far to understand the benefits of Information Technology (IT), in order to exploit it for its unique operational and strategic functionalities, and incorporate it effectively into the work environment.

According to the current literature on the deployment of information systems in the healthcare sector, HCOs suffer from slow Information Technology investment and acquisition, since they appear having less developed applications compared to other industry sectors such as banking and finance, telecommunications and airline industries (Cushman, 1997; Ward et al., 2006, Wickramasinghe and Silvers, 2003). This is mainly attributable to the fact that most HCOs are allocating a relatively small amount of resources toward information and communication technologies.

Three particular types of ICT applications may be cited as having potential for improving healthcare services provided in any given setting. One could describe the *Electronic Patient Record* as the backbone of any HCO system since it provides a central spine around which all information sharing occurs. *Decision Support tools* may be seen as an integral part of the brain of the healthcare system; while the *e-infrastructure tools* - such as Radio Frequency Identification and Internet Protocol based Communication or even satellite communication - may be seen as the lifeblood of the system which allow the tools to operate together.

Electronic health records

The electronic health record has a wide range of names and labels including, Electronic Patient Record, Electronic Medical Record, Continuity of Care Record or Patient Medical Record Information. While the different labels can denote slight changes in the scope, the content, and the use of the record, the core role of this central ITC tool remains the same: to enable comprehensive documentation of the care provided to any citizen, and to make the right information available to the right healthcare providers at the right time. The role of the electronic health record is essentially two-fold: to automate and streamline the clinician's workflow, and to generate a complete record of each clinical encounter with a patient or citizen in order to support directly or indirectly all care-related activities.

Although its name may differ, the role of the electronic health record is to provide a longitudinal record of patient health information. These data are generated during one or more encounters in a care-delivery setting. There is wide discussion on what information an electronic health record should contain. Obviously, its content will depend on its purpose, what information is needed for how long, the accessibility rights, and the relationship between the amount of information to be included and its cost. A full electronic health record system should include patient demographics, progress notes, problems, medication, vital signs, past medical history, immunization details, laboratory data, and radiology reports.

The adoption of an electronic health record system may be understood as passing through four crucial levels:

Level one	Begins with picture archiving and other departmental systems.
Level two	Builds on level one to include a common master/patient index and integration.
Level three	Grows in complexity and sophistication. Level 3 takes on board advanced medical records with clinical ordering (order communications).
Level four	Encompasses full e-Prescribing, with decision support, in a clinical setting.

Decision support tools and systems and electronic prescribing

Decision Support Systems may be defined as software systems that tap into a range of database resources to assist users in making decisions on care options. A clinical decision support system gives a healthcare provider structured (rule-based) information on diagnoses and treatments. Research by Kawamoto (2005) provides a meta-analysis of seventy reported trials and reports on the ability of decision support systems to improve clinical practice.

The most common types of decision support system analyzed in the 70 original studies were the following: computer- based systems that provide patient-specific advice on printed encounter forms or on printout attached to charts (34%), non-electronic systems that attached patient-specific advice to appropriate charts (26%), and systems that provided decision support with computerized physician order entry systems (16%). The conclusion

emerging from all 70 reported trials identified that decision support systems improved clinical practice significantly in 68% of trials.

It is important to note however that the research showed that such decision support tools must be fully integrated into the workflow of the care situation. Kawamoto and colleagues found that where the decision support was provided to clinicians automatically, the tools improved clinical care in 75% of interventions, whereas no improvement in clinical care was seen at all when clinicians were required to seek out the advice of the decision support system (suggesting that in those cases they simply did not use the decision support systems). Similarly, systems that were provided as an integrated component of charting or order entry systems were much more likely to succeed than stand-alone systems.

Connectivity and communication

To make best use of the ICT tools described (electronic healthcare records, e-Prescription, e-Decision Support, and tele-medicine), the user of the tools must enjoy fast, secure and reliable connection any-time and any-place. There are different communication systems, with different advantages and disadvantages. It has been noted that computer-based connection is of little interest to most hospital physicians (they usually have neither desks nor laps to put a computer on while seeing a patient!) while office-based physicians need quick connections that can be seamlessly integrated with any interaction with a patient without requiring a high level of data in-put from the doctor.

For this reason, key connectivity tools such as radio frequency identification and wireless integrated microsystems have a very significant application potential in healthcare. Areas of application include security (e.g. access control, anti-theft devices), medication administration, authentication and stocking (tracking of drug origin and expiration data), hospital equipment, medical waste and supply tracking as well as patient tracking, blood banking (tagging blood transfusions) and medical alert implants. For outpatient self-medication, e.g. for older adults, these tools are also an option. Some of these uses are currently handled through bar coding as radio frequency identification is currently at an early stage.

The integration of micro-electromechanical systems with microelectronics and wireless interfaces in order to create wireless integrated microsystems allow for the development of devices that are small enough to be worn comfortably and unobtrusively. Such devices can be used to collect bio-data and communicate with a bedside receiver that contacts, in turn, monitoring stations and a larger health care facility. Wireless integrated microsystems for health care are expected to be technically feasible in the coming decade. However, as with other health devices, to reduce costs, they must be part of a complete system. While the application of wireless integrated microsystems technologies in the hospital promises to improve significantly the quality and patient-centeredness of in-patient and ambulatory care, the potential impact of these devices on home care is even greater. With properly integrated home-based systems, and intelligent decision support systems,

patients could be monitored on a continuous basis and healthcare professionals could be alerted automatically when medical events merit attention.

Conclusion

To move ahead with the deployment and use of ICT in HCO, coordinated actions must be conducted in the context of a framework that links public, private, and social efforts to speed the development and deployment of priority ICT solutions. Technical knowledge, experience, and financial investments needed to establish large and complex information system projects require tapping into resources and expertise that no single organization retains. Public and private institutions, academic organizations, the industry, and financing agents must find ways to pool their assets through project partnerships and add social value to applications of informatics by providing new employment opportunities, socioeconomic development, educational opportunities, promoting health, and supporting cost-effective health services. The attainment of this mandate involves the participation of a large number of stakeholders, but the coordinating effort will necessarily concentrate on the public sector. Governments must grapple with the many transnational and global e-Health issues and address them in a comprehensive and collaborative manner.

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