Chapter 2
e$_3$Health:
Three Main Features of Modern Healthcare

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ABSTRACT

The chapter studies e-health applications in the frame of the broader concept of the e$_3$Health. It shows how the scheme proposed by J.H. van Bemmel in 1984 can be used for classification of e-health applications. Apart from the electronic feature of e-health applications, the authors discuss two other features connected with health economics and environmental health. In addition, two areas of e-health applications (electronic health record and clinical guidelines) with concrete examples from the point of view of the e$_3$Health concept are discussed.

INTRODUCTION

The main role of the e-health is to provide an easy transmission and communication of information in healthcare in forms of data or knowledge (Zvárová, 2009a). During the 58th World Health Assembly held in Geneva in May 2005, the Ministers of Health of the 192 member states of the United Nations approved the so called *e-health* Resolution (Healy, 2007) that officially recognizes the added value of the information and communication technologies for health purposes. E-health technologies opened the doorway to a new type of medical services where healthcare professionals are able to utilize them fully for prevention and management of diseases, lifelong learning and communication with colleagues and patients. Moreover, education and use of *e-health* technologies can help to change a passive attitude of patients against their diseases towards a proactive attitude of informed citizens for managing their own health. E-health concept has been the main topic of many books, papers in journals and presentations at conferences, e.g. (Iakovidis, 2004), (Demiris, 2004), (Blobel, 2008), (Andersen, 2008). New information and communication technologies (ICT) make possible to describe in a structured and unique way patient state, given procedures and the use of structured

information for statistics and examination of quality of healthcare services. For example, new tools make possible to transfer a structured electronic health record to the point of care, even in case that the transfer is provided at the point of care abroad. However, medical data can be extremely complicated due to the abundance of clinical terminology, as well as the structural complexity in the formation of the presented information. Thus, this information must be presented in a standardized format in order to ensure that the data is universally understood and organized. In order to achieve this, all healthcare information must be sent in a specialized healthcare language. The language that has been developed to overcome these obstacles is HL7 (HL7, 2009). We will discuss in more details several examples of e-health applications developed thanks to new ICT, e.g. structured electronic healthcare documentation, data standards and EHR, medical concepts modeling, formalized knowledge and clinical guidelines. In this chapter, we discuss e-health in the context of the broader e_3Health concept.
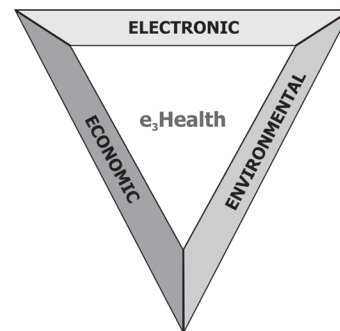
BACKGROUND

e_3Health CONCEPT

Nowadays healthcare systems in Europe and other economically developed countries are going through the process of a significant transmission. From the central controlled healthcare, they are going to process controlled or shared healthcare with the aim to reach personalized healthcare. As soon as we place a patient or a citizen in the center of a healthcare system, the system will reflect its individual needs, expectations and wishes. However, such healthcare systems should have three main features that correspond to an electronic view, economics view and environmental view.

We introduce the concept e_3Health that is harmonizing interrelationship among all three main features of the modern healthcare, i.e. electronic,

Figure 1. e_3Health features

economic and environmental (Figure 1) for all ICT tools and service in healthcare.

e3Health: Information and Communication Technologies View

Electronic health (e-health) is the first main feature of the modern healthcare. We understand e-health according to a rather broad definition of the European Commission (e-health, 2009). E-health is described as the application of information and communication technologies (ICT) across the entire range of functions that affect the healthcare sector. E-health represents the interaction between patients and health/service providers, institution-to-institution transmission of data, or peer-to-peer communication between patients and/or health professionals. E-health tools play an important role in improving the health of citizens. If the e-health tools and services are used appropriately, they may provide better and more efficient healthcare services for all people. Examples include health information networks, electronic health records, telemedicine services, wearable and portable systems which communicate, health portals, and many other ICT-based tools assisting disease prevention, diagnosis, treatment, health monitoring and lifestyle management. For this reason, the research in biomedical and healthcare informatics is the prerequisite for the development of e-health applications.

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