# Chapter 1.8
# Quality Issues in Personalized E–Health, Mobile Health and E–Health Grids

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## ABSTRACT

The electronic healthcare in the modern society has the possibility of converting the practice of delivery of health care. Currently, chaos of information is characterizing the public health care, which leads to inferior decision-making, increasing expenses and even loss of lives. Technological progress in the sensors, integrated circuits, and the wireless communications have allowed designing low cost, microscopic, light, and smart sensors. These smart sensors are able to feel, transport one or more vital signals, and they can be incorporated in wireless personal or body networks for remote health monitoring. Sensor networks promise to drive innovation in health care allowing cheap, continuous, mobile and personalized health management of electronic health records with the Internet. The e-health applications imply an exciting set of requirements for Grid middleware and provide a rigorous testing ground for Grid. In the chapter, the authors present an overview of the current technological achievements in the electronic healthcare world combined with an outline of the quality dimensions in healthcare.

## INTRODUCTION

E-health offers an optimistic vision of how computer and communication technology can help and improve healthcare provision at a distance. Health care provision is an environment that has presented remarkable improvement in the computing technology. For example, mobile e-health includes information and telecommunications technologies, which provide health care to patients that are at a distance from the supplier, and provide reinforcing tools for mobile health care. Recently, health care has embraced the mobile technology in electronic applications (Panteli et al., 2007). Various initiatives (public and private) have examined the different mobile applications of electronic health focusing on the mobility of doctors, the mobility of the patients, up to the Web based data access (Germanakos et al., 2005).

Moreover, personalized electronic health care provision through autonomous and adaptive Web applications is noteworthy (American College of Physicians, 2008). The growth of high bandwidth wireless networks, such as GPRS and UMTS, combined with miniaturized sensors and the computers will create applications and new services that will change the daily life of citizens. The citizens will be able to get medical advice from a distance but will also be in a position to send, from any place, complete and accurate vital signs measurements (Van Halteren et al., 2004). However, grid technologies and standards, currently examined in health care, will be adopted if they prove that they face all the valid concerns of security and follow the ethical guidelines (Stell, et al., 2007).

In this chapter, an overview of the existing personalized, mobile and Grid applications in electronic healthcare is presented. Further, quality aspects, which have successfully been applied in traditional health care quality assessment, are presented. A future challenge is to examine how these quality aspects can be successfully applied in electronic healthcare.

## BACKGROUND

To realize the potential of electronic health, future electronic health should be able to support patient information management and medical decision support in an open and mobile medical environment. Such an environment will be strong in knowledge, sensitive and flexible in the needs of patients, and will allow collaboration of virtual teams that work in different geographic areas. Context-specific services to each individual are defined as personalized services. These are provided by agents usually with autonomy playing the role of personal assistant (Panayiotou & Samaras, 2004; Delicato et al., 2001). Personalization is a technique used to explore both interaction and information. It allows doctors to search personalized information about the health state of each patient (Nikolidakis, et al., 2008).

Since the number and the use of wireless connection and portable devices are increasing, the complexity of designing and setting up adaptive e-health systems is also increasing. The current improvement in physiologic sensors allows realizing future mobile computing environments that can impressively strengthen health care that is provided to the community, and individuals with chronic problems. Finally, there is interest from the academic and industrial world to assess the challenge of e-health automation management of mobile Grid infrastructures (Lupu et al., 2008).

## PERSONALIZED E-HEALTH

The current tendency towards ubiquitous computing, the new sensor technologies, the powerful mobile devices and the wearable computers support different types of personalized electronic health applications. Telemonitoring applications have adopted this new technology to improve the quality of care and the quality of treatment for the sick and the elderly using questions and actions based on user preferences. The personalized application

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