Chapter 3.2
Agile Patient Care with Distributed M-Health Applications

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ABSTRACT

This chapter deals with the conceptualization, design and implementation of an m-health solution to support ubiquitous, integrated and continuous health care in hospitals. As the life expectancy of population grows in modern societies, effective healthcare becomes more and more important as a key social priority. Medical technology and high quality, accessible and efficient healthcare is currently demanded by citizens. Existing technologies from the computer field are widely used to improve patient care but new challenges demand the use of new communication, hardware and software technologies as a way to provide the necessary quality, security and response time at the point of care need. In this scenario, mobile and distributed developments can clearly help to increase the quality of healthcare systems as well as reduce the time needed to react to emerging care demands. In this chapter we will discuss important issues related to m-health systems and we deeply describe a mobile application for hospital healthcare. This application offers a modern solution which makes more agile doctor and nurse rounds on behalf of an instant online access to patient records through

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wireless networks. We also provide a highly usable application that makes simple patient monitoring with handheld devices.

INTRODUCTION

The origins of health telematics and telemedicine did mainly focus on the benefits of communicating and making available medical information from a patient to a remote medical expert instead of having to displace the injured person to a health centre (Bashur, R., 1997). Thus, telemedicine aimed to support people at the point of care wherever, for different reasons, neither the health professional nor the patient could easily travel to meet each other face to face. In this context, multiple new scenario were imagined taking into advantage Information and Communication technologies (ICT) to provide care to people in isolated regions, emergency situations or environments where a difficulty exists to displace a patient who cannot receive on site medical attention. At a parallel pace, medical informatics started to devote significant efforts to deploy health information systems that ensure medical data availability "at the point of care". Both Hospital Information Systems (HIS) and Department Information Systems (DIS) aimed to provide health professionals with adequate tools that may integrate all the medical data required by health staff (medical doctors, nursery, administrative, health managers, etc.), to treat a patient (Winter A., 2003). Consequently, the concept of Electronic Health Record (EHR) raised and, with diverse levels of success at the market level, important standardization work have been active (CEN TC251, ISO215, HL7) making efforts to structure in a secure and efficient way the enormous amount of data that can be associated to a person´s health history (Dolin R., 2006). However, the traditional view of Medical Informatics focused more on those situations where the health professionals are, for instance, present at their hospital or care centre office providing a consultation service rather than those scenarios that oblige them to be displacing in order to assist in-bed patients in the hospital or elderly and disabled people at home.

A solution for the challenge of mobile care support came from the concept of m-health proposed in the '90s to exploit the potentiality of mobile communications to assist care professionals or patients "in movement" (Istepanian R.S.H, 2004). The original scenarios of health telematics were changing and technologies were no longer expected to only provide medical information at a fixed computer or medical device where the specialist is supposed to be located, but to "bring" valuable information to the professional wherever he or she is located, in movement, whichever mobile or wireless network is available. Mobile networks were initially used to transmit data from mobile patients; furthermore, the m-health concept started to think about mobile professionals or wirelessly connected citizens who are displaced from a fixed location. A typical example from the first ideas was the utilization of emerging GSM systems to transmit biomedical signals, like an ECG or blood pressure, in emergency situations where an injured patient is moved from a mobile ambulance unit to the hospital (Pavlopoulos S., 1999). Most advanced research on m-health has mainly treated with the unobtrusive and ubiquitous integration of e-care or telemedicine services with remote health information systems through GPRS/UMTS, WLAN or WPAN technologies as well as provision of context aware health care ad-hoc support including Quality of Service features (Oliver N., 2006) (Wac K., 2007).

Innovative m-health solutions for health professionals rely on the possibilities to exploit the potential of next generation advanced mobile or wireless technologies (3G and above, WiFi/WiMax) together with the availability and affordability of usable and portable electronic devices such a PDA, smartphone, tablet PC or handheld that may provide health care professionals with a full EHR to support medical attention at the patient´s point of care. It is unquestionably that