# Chapter 7
# From Personal to Mobile Healthcare:
## Challenges and Opportunities

**Elena Villalba-Mora**
*Technical University of Madrid, Spain*

**Ignacio Peinado**
*Getafe University Hospital, Spain*

**Leocadio Rodriguez-Mañas**
*Getafe University Hospital, Spain*

## ABSTRACT

*mHealth is an emerging field that comprises the delivery of health through mobile technologies, being part of a broader concept: eHealth. With the rapid advances and adoption of mobile technologies and applications, mHealth opens new opportunities to deliver healthcare and wellness promotion through personal mobiles. This will transform the current delivery of services linked to particular places to a delocalization and personalization of services delivery. Although the adoption and integration of mobile technologies is high across the globe, the particular adoption of mHealth remains low and scattered due to some remaining challenges. This chapter presents the current picture of mHealth and it later discusses the opportunities both at market level and with regards to healthcare delivery. Then, it presents future research directions as big data; and it closes with conclusions on this challenging emerging field.*

## INTRODUCTION

eHealth lies in the *intersection of medical informatics, public health and business; referring to health services and information delivered or enhanced through the Internet and related technologies* (Eysenbach, 2001). The term exceeds a mere technical development, being also a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology (ICT).

Mobile Health (hereafter mHealth) is a component of eHealth. No standardized definition of mHealth has been established yet. One of the most cited definitions of mHealth is the one provided by Istepanian et al. (2006), which defined mHealth as *emerging mobile communications and network technologies for healthcare*. In 2011, The World Health Organisation (WHO) proposed a broader definition that included also sensors as part of the mHealth paradigm, as *medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices* (WHO, 2011).

Different regions across the World are facing different challenges that in their context push mHealth deployment and adoption. The 2011 WHO Survey showed that the imperative cut to healthcare costs is driving mHealth in higher-income countries, whereas in lower-income countries the driver is the need for access, mainly to primary care.

In higher-income countries, healthcare systems must offer and assure high-quality and affordable care to all citizens. Thus, these systems must tackle the demographic change, the mobility of patients and the associated rising healthcare costs. As an example, the proportion of European population aged 65 years and over is predicted to rise from 17.1% in 2008 to 30.0% in 2060, and those aged 80 and over rising from 4.4% to 12.1% over the same period (Eurostat, 2008). One of the direct consequences will be the increased prevalence of chronic diseases, which will be leading to a higher number of people with compromised health and quality of life, higher demand for healthcare services and loss of productivity due to reduced capacity of the workforce. Chronic diseases significantly strains healthcare services causing an increase in the healthcare expenditure. This expenditure in European countries, measured as a percentage of Gross Domestic Product (GDP), is expected to rise from 9% in 2007 to around 16% by 2020 (PWC, 2005). Chronic diseases are now responsible for the consumption of the vast majority of healthcare resources (more than 70% in higher-income countries).

In contrast, in emerging countries the need to access care where there are not services in place have pushed the adoption of mHealth as an alternative. According to the 2011 WHO survey, in Africa and Asia, most mHealth services focus on improving the efficiency of the healthcare workforce and systems; and in the prevention of infectious diseases (e.g. in India, South Africa and Kenya).

ICT and mobile technologies may be used in many aspects related to the health sector, healthcare delivery, public health, research and innovation, education and training of professionals and citizens and patients' empowerment and lifestyle. For instance, mHealth may delocalize the care delivery, which is nowadays mainly performed in hospitals when an acute event already has occurred, which represents a reactive model. Through the use of mHealth, healthcare shifts from reactive, hospital-based care to a proactive, preventive care, including self-care (Bonfiglio, 2012). The benefit of this delocalization is twofold: on the one hand, healthcare can be provided in remote areas like rural zones assuring quality of health delivery for all. On the other hand, healthcare systems can be used at home by patients and informal caregivers, whereas they are remotely followed by professionals. Professionals can remotely assess patients' health status periodically and early detect an event. This way the outcome of the patient improves by reducing co-morbidities and even mortality. Moreover, to have information between face to face encounters may help the professional to assess the patient's evolution and to better understand the diseases and treatments' effectiveness.

This chapter aims to present and discuss the challenges and opportunities of the mobile health. Following this introduction of the topic, the next sections describe the background of personal healthcare applications and the current picture of mHealth around the globe. Later, a section discusses the challenges and opportunities of mHealth. Finally, a conclusion closes the chapter.

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