# Chapter 41
# Mobile Platforms Supporting Health Professionals:
## Need, Technical Requirements, and Applications

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## ABSTRACT

*Mobile computing is beginning defining the future of healthcare. The vast majority of mHealth applications are related to fitness, training and self-monitoring; limited applications are targeting physicians and doctor-patient interactions. However this can change. In this chapter the background of applications related to medical imaging and clinical and laboratory medicine is analyzed. A technological framework supporting mHealth applications in an agnostic manner is also introduced. Within this framework there are implemented two application examples, one application (ImaginX) supporting a health ecosystem (hospitals, radiologists, clinicians, patients) for medical image management. The second application (HPVGuard) supports a divergent but cooperating environment of laboratory and clinical doctors and patients involved in cervical cancer prevention and control. The two applications are analyzed and issues related to user acceptance and future directions are presented. mHealth has the potential to shape health future not by just translating existing applications but by inspiring new ideas.*

## INTRODUCTION

Mobile Health (mHealth) is the application of medicine and public health through mobile devices. The last two decades the use of mobile communication devices has rapidly grown. Nowadays, the computing capacity, the large displays with high resolution, the capability to have a communication channel always connected to the internet and the www, along with the concept of smartphone as this is implemented by

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enhanced and user friendly operating systems and applications, has converted the mobile phone practically to a mobile computer. This gives tremendous opportunities for applications into numerous sectors, among them mHealth (Kastania et al., 2012; Nilsen et al., 2012; Steinhubl et al., 2013).

Mobile computing is nowadays beginning to define the future of healthcare (Kastania et al., 2012) and is foreseen as a hot topic in the business world and healthcare the forthcoming years. mHealth is not just a replacement and "translation" of health care applications from fixed stations to mobile devices, mobile computing is an enabling technology for new mHealth applications such as 24x7 healthcare support and especially ambulatory medicine (K. Banitsas et al., 2005; K. A. Banitsas et al., 2006; Kiselev et al., 2012; Pavlopoulos et al., 1998; Rosales Saurer et al., 2009; Zerth et al., 2012). mHealth applications are already available in a variety of health-related domains: diabetes management (Quinn et al., 2011), asthma management (Gupta et al., 2011), obesity control (Patrick et al., 2009), smoking cessation (Ghorai et al., 2014; Ybarra et al., 2014), stress management (Clarke et al., 2014) and depression treatment (Burns et al., 2011). The vast majority (43%) of applications are related to fitness and training and self-monitoring (74.8%) (Sama et al., 2014), despite currently there are rather limited applications targeting physicians and doctor-patient interactions (Martin, 2012), this picture has the potential to change quickly.

In this chapter, we analyze the background for medical imaging as well as clinical and laboratory medicine, is highlighted the role of cloud computing for the various involved actors in mHealth applications, security issues, and privacy protection are raised and interoperability problems and standards are mentioned. Subsequently, a technological framework capable to support the health care application in an agnostic manner is introduced and described. Specifically, a platform capable to host new but diverging applications, to support different health care sectors and being capable to support applications for mobile devices. Within this framework two examples are described. The first application (ImaginX) supports an ecosystem of health (hospitals, radiologists, clinicians, patients) having the need for medical imaging management, and the second application to support a divergent but cooperating environment of laboratory doctors, clinical doctors and patients related to cervical cancer prevention and control (HPVGuard). Finally, matters relating to the acceptance of mobile health applications by the users and future directions are highlighted.

## BACKGROUND

### Medical Imaging

It is a common opinion of all physicians, that imaging is a key component of the patient health record and is often critical for diagnosis and treatment. Currently, the rapid development of medical research and new technologies produce a continuous stream of knowledge about medical imaging and a constantly growing volume of image data. It is forecasted that there will be an increase in the US cloud computing market for medical images approximately 27% by 2018 at a Compounded Annual Growth Rate (CAGR). This is mainly due to the growing volume of medical images and the increasing costs of owning and maintaining Picture Archiving and Communication Systems (PACS) (GlobalData, 2012). Access to medical images via mobile devices is today possible as both size of displays, their resolution and communication channels bandwidth have increased. Medical imaging is not just restricted to radi-