Chapter 13
The Use of Mobile Health Applications for Quality Control and Accreditational Purposes in a Cytopathology Laboratory

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ABSTRACT

Over the last decade, the practice of clinical cytopathology was dramatically influenced by the wide implementation of informatics and computer sciences into the laboratory workflow. New applications, especially in the field of Mobile Health technology, will enhance the opportunities for improvement in the field of cytological data management and sharing. In this chapter, the authors present a thorough research of mobile applications related to cytopathology and try to foresee applications that, if available on mobile devices, may benefit the modern cytopathology laboratory and its clients. Also, the feasibility of adopting mobile applications for inter-laboratory comparisons, proficiency testing and diagnostic accuracy validation is examined. Finally, the role of mobile applications for providing or/and enhancing the existing laboratory capabilities through educational training and other research activities is investigated. Economic or medicolegal aspects of the expected wide adoption and implementation of mobile applications in the field of Cytopathology will also be covered.

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INTRODUCTION

During the last decades, medical data deriving from the analysis of patient samples was stored in medical laboratories and was provided to physicians manually (Brender & McNair, 1996). The absence of an integrated laboratory information system was making medical data transfer slow and possibly ineffective while results inquiry/control and quality control (QC) was a rather expensive and time-consuming process (Kubono, 2004).

Over the last decade, the wide implementation of laboratory information systems became a necessity dictated by the need for real-time results and the increasing role of laboratory medicine in therapeutic decisions (Georgiou & Westbrook, 2006).

Laboratory information systems have been implemented in many medical laboratories wishing to improve their quality standards. A laboratory information system (LIS) is a valuable tool for medical professionals in order to manage complex processes, ensure regulatory compliance, promote collaboration between departments of the same or different laboratories, deliver detailed reports, and enhance the laboratory networking capabilities. This results in better data management and sharing between the laboratory and its clients (laboratories, clinicians or examinees) (Brender & McNair, 1996).

Cytopathology laboratory services are essential for patient care and include arrangements for examination requests, patient preparation and identification, collection, transportation, storage, processing and evaluation of clinical samples, together with subsequent interpretation, reporting and advice.

The main cytological examination, the well-known Papanicolaou test consists a widely applied, cost-effective screening method for the early detection of cervical dysplasia and cancer. A well-written and well-implemented LIS software can improve the diagnostic accuracy of this method by introducing new emerging technologies. Pap smears screening, and cytological diagnosis provision for the vast majority of the female population requires a large number of skilled cytotechnologists and cytopathologists. Since the number of these professionals is still inadequate, the development of automated laboratory instruments and screening systems may provide a practical and satisfactory solution. Laboratory informatics are regarded nowadays as an essential tool for laboratory's quality assurance (QA) and improvement due to its key role in the pre-analytical, analytical and post-analytical diagnostic phases. A well-written and well-implemented LIS software can use medical data for the documentation of QC measures and the improvement of the laboratory's performance.

Mobile Health technology is changing the way enterprises, institutions and people understand and use current software systems. It allows imaging flexibility and may be used for creating a virtual mobile workplace. Security and privacy issues have to be addressed in order to ensure the wide implementation of Mobile Health technology in the near future.

The purpose of this chapter is to present our experience on the application of Mobile Health technology to Cytopathology Laboratories, and on the possible ways Mobile Health technology can encourage or facilitate the wide implementation of ISO 15189:2012 specific requirements concerning every laboratory aspect and process.

Furthermore, we examine the feasibility of applying Mobile Health technology for laboratory information systems data sharing and handling, for medical inter-laboratory comparisons, proficiency testing and for validating the accuracy of cytological diagnoses.

In addition, we examine the role of Mobile Health applications to provide or/and enhance the existing laboratory capabilities for educational training and other research activities.