Application of a Medical Information System for Image-Based Second Opinion Consultations: Georgian Experience

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ABSTRACT
This article will present the architecture of the medical information system (MIS) developed in Georgia and its application for image-based second opinion consultations. The primary goal of the MIS is patient management. However, the system can be successfully applied for image based second opinion consultations. Five hundred Georgian language electronic medical records from the cervical screening activity illustrated by images were selected for second opinion consultations. It has been shown, that the MIS is perspective and actual technology solution. It can be successfully and effectively used for image based second opinion consultations. The ideal of healthcare in the information age must be to create a situation where healthcare professionals spend more time creating knowledge from medical information and less time managing this information. The application of available and adaptable technology and improvement of the infrastructure conditions is the basis for eHealth applications.

Keywords: Digital Images, eHealth Applications, Electronic Medical Records, Medical Information System, Second Opinion Consultations

INTRODUCTION
There is a very clear need for the expanded application of information technology (IT) in healthcare. Clinical workflow still depends largely on manual, paper-based medical record systems, which is economically inefficient and produces significant variances in medical outcomes. The medical information system (MIS) is at the heart of IT implementation strategy in healthcare systems around the world. This is a comprehensive solution that automates the clinical, administrative, and supply-chain functions. It enables healthcare providers to improve their operational effectiveness, to reduce costs and medical errors, and to enhance the quality of care. The aim of MIS was and is as simple as relevant: to contribute to and ensure a high-quality, efficient patient care. The relevance of “good” MIS for the high-level quality of care is obvious. Without having

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appropriate access to relevant data, practically no decisions on diagnostic, therapeutic, or other procedures can be made (Clamp & Keen, 2007).

The existing models and protocols of MIS are based on the implementation of profiles such as HL7 and DICOM. Despite obvious advantages and benefits, practical application of MIS in the everyday practice of healthcare organization is slow. Research and development projects are ongoing in several countries around the world to develop MIS: examples include Canada, Australia, England, the United States, and Finland (Hayrinen, Saranto, & Nykanen, 2008). MIS is used primarily for setting objectives and planning patient care, documenting the delivery of care, and accessing the outcomes of care. It includes information regarding patient needs during episodes of care provided by different healthcare professionals (van Ginneken, 2002). The amount and quality of information available to healthcare professionals in patient care has an impact on the outcomes of patient care and the continuity of care. The information included in MIS has several different functions in the decision-making process in patient care. It also supports decision making in management and health policy. MIS is effectively used for creation, editing and maintenance of the electronic medical records (EMR). In many countries, it is tedious to obtain copies of medical records, which makes it difficult to realize second opinion consultations (Liu, Shih, & Hayes, 2011). EMR created by MIS can be maintained, shared with colleagues, and can support the maintenance of accurate and complete medical records (US Department of Health and Human Services. Office for Civil Rights, 2008). An EMR can take multiple forms: an independent software application running on a single computer; a web service belonging to a single organization; a general web service as a platform with which to collect different types of medical information; or a USB-based EMR (Bonander & Gates, 2010; Kaelber, Jha, Johnston, Middleton, & Bates, 2008). An MIS has been launched in Georgia. Its primary goal is patient management and creation of EMR. However, the system is also targeted at creating a unified information space in the framework of the wider medical organization. It can be successfully used for implementation of telemedicine consultations too. Telemedicine services are rapidly becoming an integral part of many hospitals and clinics around the world (Harnett, 2006; Heidenreich & Blobel, 2009). In many programs, image based second opinion consultations account for over 50% of all eHealth activities. The goal of this article is to present the application of MIS for image based second opinion consultations under the conditions prevailing in Georgia.

Georgia is not lagging far behind in the field of the image-based second opinion consultations. Perspectives and strategies of this approach are currently evolving, as emerging requirements would allow self-sustainable large scale exploitation while recent technological developments are available to support integrated and cost-effective solutions to such requirements. However, as far as we know image based second opinion consultations have proceeded to large scale exploitation, even after successful technological demonstration phases (Abdirad, Sarrafpour, & Ghaderi-Sohi, 2006; Brauchli & Oberholzer, 2004; Brauchli et al., 2004; Kaplan et al., 2002; Williams, Mullick, Butler, Herring, & O’Leary T, 2001). Image based second opinion consultations are the most important for ensuring the safe medical care.

Use of image based second opinion consultation appear to have many advantages over conventional light microscopy. The International Union Against Cancer (UICC) has estimated that at least in 5-10% of cancer cases a pathologist needs consultation during routine work because of uncertainty. Sending glass slides or paraffin blocks by mail or courier for experts in the field, is a time consuming way especially in critical specimens for pathologists working alone in distant hospitals with no facilities for intradepartmental consultation (Furness, 1997). Besides, the probability of loss and damage are always present. Today, image based second opinion consultations in the forms of static and dynamic series seem to be the basic solution for this major problem. Conventional pathology and cytology with glass slide has many limitations. For example they
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