Chapter V
Overview and Analysis of Electronic Health Record Standards

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ABSTRACT

A fundamental requirement for achieving continuity of care is commonly accepted to be the integration and interoperability of different clinical oriented systems towards the realization of a "longitudinal" Electronic Healthcare Record. To enable seamless integration of various kinds of IT applications into a healthcare network, a commonly accepted framework based on international relevant standards has become an urgent need. However, there is much marketplace confusion today in the healthcare domain, due to the variety of overlapping or complementary interoperability standards and initiatives, which have evolved over the years addressing integration of applications at different levels. This chapter provides a brief overview of the most relevant Electronic Healthcare Record standards, by examining the level of interoperability and functionality they provide, in terms of context, structure, access services, multimedia support, and security, to provide healthcare decision-makers and system integrators with a clear perspective regarding the capabilities and limitations of each standard.

INTRODUCTION

In order to manage the safe and effective delivery of complex and knowledge intensive healthcare, clinical practitioners increasingly require timely access to detailed, accurate, and complete patient healthcare records, along with efficient communication methods to share segments of a patient's record within and between care teams (Smith, 1996). Also, as the focus of healthcare delivery, over the years, has shifted progressively from medical centres of excellence to primary care, community settings, and to the patient's personal environment (e.g., home care), patients nowadays require as well access to their own healthcare records to an extend that allows them to play an active role in their health management (Lewis et al., 2005). The development of a longitudinal, patient-centred electronic healthcare record (EHR), which has been a key research field in the health informatics domain for many years, is a much anticipated solution to these issues.

According to Tang and McDonald (2006), "an EHR is a repository of electronically maintained information about an individual's lifetime health status and health care, stored such that it can serve the multiple legitimate users of the record". Iakovidis (1998) also argues that the purpose of an EHR should be toward the support of continuity of care, education and research. On the other hand, an EHR system is defined as a set of interoperable information system components establishing appropriate mechanisms to generate, use, store and retrieve an EHR, while ensuring confidentiality at all times (Blobel, 2002). Ideally, an EHR shall include information such as patient identification, observations, vital signs, physical examinations, treatments, therapy interventions, administered drugs, allergies, diagnostic and laboratory tests, as well as imaging reports.

Yet, much of these fine-grained clinical information on which quality care depends is usually stored in distributed, isolated clinical systems and databases in different kinds of proprietary formats within healthcare organizations. Typical formats may include mixtures of narrative, structured, coded, and multimedia entries, unstructured or structured document-based storage, relational database tables, as well as digitized hardcopies maintained in a document management system. One of the major impediments towards the realization of an EHR is the fact that healthcare organizations, all too frequently, consist of a large number of disparate and heterogeneous information systems, which have been deployed to support specific departmental needs Most of these information systems today are proprietary and have been designed autonomously by different vendors, in order to optimize specific processes within various departmental units. Therefore, each system, required to participate in the co-operative healthcare process and facilitation of an EHR, usually differs in technological and architectural aspects (e.g., user interface, functionality, presentation, terminology, data representation and semantics), preserving the problem of system integration prevalent and of significant complexity (Xu et al., 2000; Lenz and Kuhn, 2002). This has constituted a severe interoperability problem in the healthcare informatics domain, allowing healthcare organizations to be left with islands of heterogeneous systems and technologies that are difficult to integrate. Thus, the requirements to provide clinical professionals of any speciality with an integrated, and relevant to their profession, view of the complete health care history of each patient under their care has so far proved to be a significant challenge. Nevertheless, this need is now widely recognised to be a major obstacle to the safe and effective delivery of healthcare services, by clinical professions, by health service organisations and by governments internationally.

There are many perceived benefits of making EHR systems interoperable. EHRs can contribute to more effective and efficient patient care by facilitating the retrieval, acquirement, organization, processing, communication, and view of patient health record data from different sites (Tang