Chapter 7.7
Security in
E–Health Applications

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ABSTRACT

This chapter presents security solutions in integrated patient-centric Web-based health-care information systems, also known as electronic healthcare record (EHCR). Security solutions in several projects have been presented and in particular a solution for EHCR integration from scratch. Implementations of Public key infrastructure, privilege management infrastructure, role based access control and rule based access control in EHCR have been presented. Regarding EHCR integration from scratch architecture and security have been proposed and discussed. This integration is particularly suitable for developing countries with wide spread Internet while at the same time the integration of heterogeneous systems is not needed. The chapter aims at contributing to initiatives for implementation of national and transnational EHCR in security aspect.

INTRODUCTION

E-health has become the preferred term for healthcare services available through the Internet. While the first generation of e-health applications comprises educational and informational Web sites, at present e-health has grown into national and transnational patient centric healthcare record processing. A patient centric healthcare record, also called electronic healthcare record (EHCR) and electronic patient record (EPR), enables a physician to access a patient record from any place with Internet connection and give a new face to integration of patient data. Such integration can improve healthcare treatment and reduce the cost of services to a large extent. Benefits are based on extended possibilities for collaboration through sharing data between a physician and a patient and between physicians. In such large scale information systems, which spread over different

domains, standardization is highly required. The second paragraph describes the main issues in e-health security as well as the results of EU projects EUROMED and TRUSTHEALTH, while the third paragraph presents MEDIS prototype of national healthcare electronic record suitable especially for developing countries where the Internet is widespread and healthcare information systems are not developed to large extent and therefore integration from scratch is proposed.

EXISTING SOLUTIONS

In general, the following lines of development for healthcare information system were considered as important (Reichertz, 2006): (1) the shift from paper-based to computer-based processing and storage, as well as the increase of data in health care settings; (2) the shift from institution-centered departmental and, later, hospital information systems towards regional and global HIS; (3) the inclusion of patients and health consumers as HIS users, besides health care professionals and administrators; (4) the use of HIS data not only for patient care and administrative purposes, but also for health care planning as well as clinical and epidemiological research; (5) the shift from focusing mainly on technical HIS problems to those of change management as well as of strategic information management; (6) the shift from mainly alpha-numeric data in HIS to images and now also to data on the molecular level; (7) the steady increase of new technologies to be included, now starting to include ubiquitous computing environments and sensor-based technologies for health monitoring.

As consequences for HIS in the future, the need for institutional, national, and international HIS-strategies is first seen; second, the need to explore new (transinstitutional) HIS architectural styles is needed; third, the need for education in

Figure 1. Degree of sophistication in healthcare information systems. Note. From Information Systems, Sao Paolo University Technical Report, 2006)
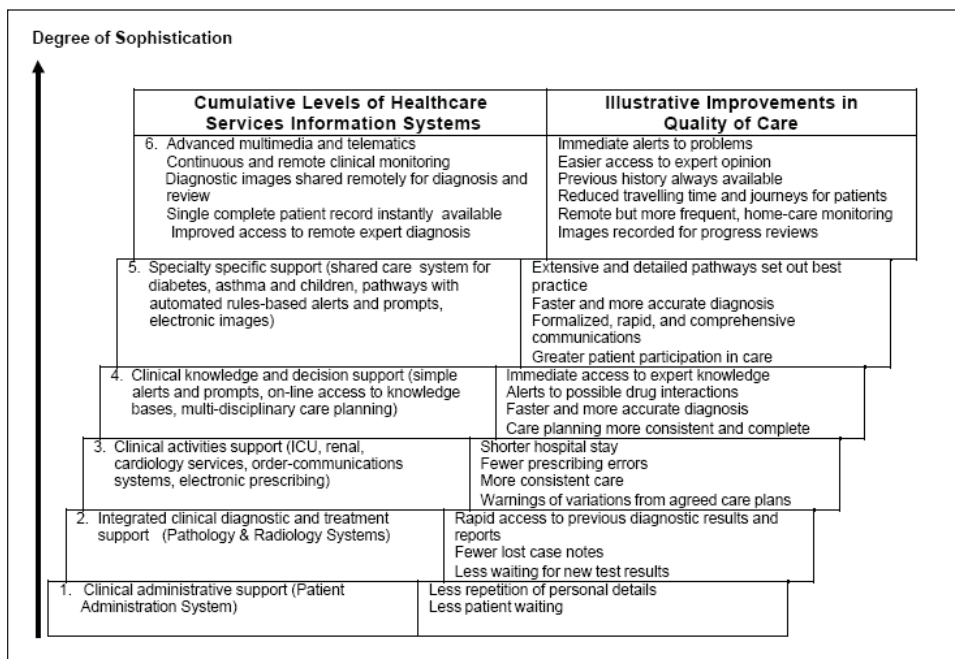
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