



## **Chapter VIII**

# **Engineering Dependable Health Information Systems**

Khin Than Win, University of Wollongong, Australia

Peter Croll, Queensland University of Technology, Australia

### **ABSTRACT**

*Effective and appropriate implementation of health information systems assists with an organization's knowledge management. To enhance a user's trustworthiness and full adoption, a health information system needs to be dependable. This chapter reviews the different development methodologies available for engineering dependable solutions and their application by citing two case studies as an example. Health information systems cover a diverse set of applications. The focus in this chapter is on the development of electronic health record systems, the importance of dependability, and the relationship between dependability and data quality of the health record systems.*

### **INTRODUCTION**

Knowledge management assists people to be more capable contributors to an organization's strategic plans (Wilson & Snyder, 1999). The success of an organization depends on the quality of that knowledge. To support Knowledge management successfully, health information systems must provide both information and guidance to the organizations. Health information systems are complex and diverse. They involve computer-stored databases containing patient information to support medical order

entry, results reporting, decision support systems, clinical reminders, the pharmacy system, management information system, epidemiological surveillance system, communications and networking systems and other healthcare applications (Anderson & Aydin, 1994; Wiederhold & Perreault, 1990). It is widely recognized within the health industries that effective and appropriate usage of health information systems would greatly assist in creation of successful knowledge-based organizations.

Health information systems either contain or make direct reference to sensitive health data for individual patients. It is of utmost importance that such data is both secure and free from error. Inaccurate or insecure information can be detrimental to the individual and subsequently to the company or organization responsible. Any computer system where failure could have an impact on a person's health or be life threatening should be regarded as a safety-related system (IEC 61508, 2000). Privacy is now regarded as a pertinent area of growing concern, as more health information is available electronically online. Hence, it is essential to develop health information systems that can be trusted and are dependable. Such systems do not evolve over time but must be developed with sufficient rigor using appropriate engineering methods. To assist the reader in understanding what is required, this chapter will outline the essential criteria for developing dependable systems and detail some recent experiences from relevant health information case studies. The development of successful knowledge management health information systems will depend on how well these techniques are applied.

## **HEALTH INFORMATION SYSTEMS**

Health information systems cover a wide-ranging and diverse set of applications. These include: electronic health record systems, hospital information systems, nursing information systems, laboratory information systems, pharmacy systems, radiology systems, patient monitoring systems, office systems, bibliographic retrieval systems, clinical decision support systems, clinical research systems, medical education systems and health assessment systems (Wiederhold & Perreault, 1990). It is difficult and could be misleading to generalise across the full spectrum. Hence, this chapter will focus on one of the key areas of development, the Electronic Health Record.

## **PURPOSES OF ELECTRONIC HEALTH RECORD**

Schloeffel and Jeselon have categorised the purpose of Electronic Health Records as either primary or secondary (Schloeffel & Jeselon, 2002).

### **Primary Purpose**

Its primary purpose is to provide a documented record of care, by means of communication among clinicians, contributing to the patient's care for the benefit of patient and clinicians. It will support the present and future care by the same or other clinicians.

17 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/engineering-dependable-health-information-systems/7229](http://www.igi-global.com/chapter/engineering-dependable-health-information-systems/7229)

## Related Content

---

### Toward Integrating Healthcare Data and Systems: A Study of Architectural Alternatives

Timoteus B. Ziminski, Steven A. Demurjian, Eugene Sanzi and Thomas Agresta (2016). *Maximizing Healthcare Delivery and Management through Technology Integration* (pp. 270-304).

[www.irma-international.org/chapter/toward-integrating-healthcare-data-and-systems/137590/](http://www.irma-international.org/chapter/toward-integrating-healthcare-data-and-systems/137590/)

### Best Practices for Implementing Electronic Health Records and Information Systems

Beste Kucukyazici, Karim Keshavjee, John Bosomworth, John Copen and James Lai (2010). *Health Information Systems: Concepts, Methodologies, Tools, and Applications* (pp. 994-1013).

[www.irma-international.org/chapter/best-practices-implementing-electronic-health/49913/](http://www.irma-international.org/chapter/best-practices-implementing-electronic-health/49913/)

### A Roadmap to the Introduction of Pervasive Information Systems in Healthcare

Fotis Kitsios, Thanos Papadopoulos and Spyros Angelopoulos (2011). *Wireless Technologies for Ambient Assisted Living and Healthcare: Systems and Applications* (pp. 1-13).

[www.irma-international.org/chapter/roadmap-introduction-pervasive-information-systems/47117/](http://www.irma-international.org/chapter/roadmap-introduction-pervasive-information-systems/47117/)

### Fusion of Multiple Sensors Sources in a Smart Home to Detect Scenarios of Activities in Ambient Assisted Living

Norbert Noury, Pierre Barralon, Nicolas Vuillerme and Anthony Fleury (2012). *International Journal of E-Health and Medical Communications* (pp. 29-44).

[www.irma-international.org/article/fusion-multiple-sensors-sources-smart/70007/](http://www.irma-international.org/article/fusion-multiple-sensors-sources-smart/70007/)

## Creating a User-Driven Student Perspective in a Nepalese Medical School

P. Ravi Shankar (2012). *International Journal of User-Driven Healthcare* (pp. 49-52).

[www.irma-international.org/article/creating-user-driven-student-perspective/64330/](http://www.irma-international.org/article/creating-user-driven-student-perspective/64330/)