



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

Related Content

An Unusual Association of Lung and Ovarian Malignancy in a Young Nonsmoker Female

Sujoy Dasgupta (2012). *International Journal of User-Driven Healthcare* (pp. 20-28).
www.irma-international.org/article/unusual-association-lung-ovarian-malignancy/75177/

Mathematical Programming and Heuristics for Patient Scheduling in Hospitals: A Survey

Daniel Gartner and Rema Padman (2017). *Handbook of Research on Healthcare Administration and Management* (pp. 627-645).
www.irma-international.org/chapter/mathematical-programming-and-heuristics-for-patient-scheduling-in-hospitals/163859/

Record Linkage in Healthcare: Applications, Opportunities, and Challenges for Public Health

Gulzar H. Shah, Kaveepan Lertwachara and Anteneh Ayanso (2010). *International Journal of Healthcare Delivery Reform Initiatives* (pp. 29-47).
www.irma-international.org/article/record-linkage-healthcare/51683/

Creating Secondary Learning Resources from BMJ Case Reports through Medical Student Conversational Learning in a Web Based Forum: A Young Man with Fever and Lymph Node Enlargement

Tamoghna Biswas, Parijat Sen, Sujoy Dasgupta, Subhrashis Guha Niyogi, G. C. Ghosh, Kaustav Bera and Rakesh Biswas (2013). *Clinical Solutions and Medical Progress through User-Driven Healthcare* (pp. 118-129).
www.irma-international.org/chapter/creating-secondary-learning-resources-bmj/67741/

A Semantic-Based Dynamic Search Engine Design and Implementation for Electronic Medical Records

Weider D. Yu and Seshadri K. Yilayavilli (2010). *International Journal of E-Health and Medical Communications* (pp. 61-73).

www.irma-international.org/article/semantic-based-dynamic-search-engine/43917/