

Chapter 18

Health Information System

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ABSTRACT

Information systems (IS) help in managing healthcare costs and in improving the quality of care. IS are uniquely positioned to capture, store, process, and communicate timely information to decision makers for better coordination of healthcare at both the individual and population levels. One of the most interesting aspects of HIS (Health Information System) is how to manage the relationship between healthcare providers and patients. The main focus of this Chapter is a brief overview of Health Information Systems and the description of the techniques that can be used to develop the health information systems. There are various emerging tools and technologies in creating and managing HIS like data mining and geographical information system. Developing HIS can improve access for geographically isolated communities; provide support for health care workers; aid in data sharing; provide visual tools linking population and environmental information with disease outbreaks.

The main objectives of this chapter are to present:

1. Concepts of health information system,
2. Tools and techniques used to develop the health information system,
3. Future research directions in this field.

INTRODUCTION

Healthcare is an information intensive industry (Rodrigues, 2010), where reliable and timely information is a critical resource for the planning and monitoring of health care services at organizational, regional, national and international levels.

The nature of healthcare industry has changed over time, from a relatively stable industry to a dynamic one. A Health Information System (HIS) is the combination of healthcare's business process and information systems to deliver better healthcare services.

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Rodrigues (2010) defines HIS as powerful ICT-based tools able to make health care delivery more effective and efficient. The data related to both clinical and administrative processes can be integrated with the data from other entities in order to be effective, and must be subject to strict rules in terms of confidentiality and security safeguards, especially for patient data.

Developing HIS is important because of (Haux 2006):

1. Increase of health care data;
2. The inclusion of patients and health consumers as HIS users, besides health care professionals and administrators;
3. The use of HIS data for health care planning as well as clinical and epidemiological research;
4. Focus on strategic health information management; and
5. The steady increase of new technologies, like including sensor-based technologies for health monitoring.

BACKGROUND

A number of health information systems are developed for patients with a health crisis or medical concern and for primary care providers.

Rahimi, Vimarlund & Timpka (2009) organized the knowledge gained in qualitative studies performed in association to HIS implementations and used this knowledge to outline an updated structure for implementation planning. Duan, Street & Xu (2011) suggested to use correlations among nursing diagnoses, outcomes and interventions to create a recommender system for constructing nursing care plans. Kuo & Chung (2012) integrated information technology and medical-related technologies to develop a healthcare information system for Comprehensive geriatric assessment (CGA).

Shoba (2013) developed a HIS that followed two tier architecture for e-doctor service where the consistent database were maintained by the hospital server to update the queries instantly by the user. Dirk, Klaus & Tobias (2014) described HIS prototype that addressed a common practical and manifested in the short interaction times between healthcare professionals and patients. Çeken (2014) proposed a healthcare information system framework which consists of wireless sensor and cellular networks, a MATLAB interface, a database, and a web based monitoring interface. Al-Sakran (2015) described the conceptual design of an e-healthcare system, which implements integration strategies and suitable technologies for a HIS.

MAIN FOCUS OF THE CHAPTER

The main focus of this Chapter is a brief overview of Health Information Systems and the description of the techniques that can be used to develop the health information systems.

1. Components of Health Information Systems

- The HIS components can be divided into three categories (Figure 1): inputs, processes and outputs.
- The *inputs* category includes all HIS *resources*.
- The *processes* used by an HIS include Indicators, Data sources and Data management
- The HIS *outputs* is the information produced which needs to be relevant, accessible, and useful evidence for decision making.

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