

# Process Level Benefits of an Electronic Medical Records System

**Abirami Radhakrishnan**

*Morgan State University, USA*

**Dessa David**

*Morgan State University, USA*

**Jigish Zaveri**

*Morgan State University, USA*

## INTRODUCTION

The challenges faced by U.S. health care system are vividly explained in the U.S. Government's health information technology plan,

The U.S. health care system faces major challenges. Health care spending and health insurance premiums continue to rise at rates much higher than the rate of inflation. Despite spending over \$1.6 trillion on health care, there are still serious concerns about preventable errors, uneven health care quality, and poor communication among doctors, hospitals, and many other health care providers involved in the care of any one person. The Institute of Medicine estimates that between 44,000 and 98,000 Americans die each year from medical errors. Many more die or have permanent disability because of inappropriate treatments, mistreatments, or missed treatments in ambulatory settings. It has been found that as much as \$300 billion is spent each year on health care that does not improve patient outcomes – treatment that is unnecessary, inappropriate, inefficient, or ineffective. All these problems – high costs, uncertain value, medical errors, variable quality, administrative inefficiencies, and poor coordination – are closely connected to inadequate use of health care information technology. (U.S. Federal Government Health Information Technology Plan, 2004).

These challenges have resulted in formidable and compelling pressures on the U.S. Federal Government, professional bodies, and accreditation authorities to undertake measures to bring about significant improvements in the quality of health care in both inpatient and outpatient settings. Quality is defined by the Institute of Medicine as having three overlapping domains: safety of patients and practitioners, practice consistent with current domain knowledge, and patient centered care

(Kohn, Corrigan, & Donaldson, 2000). In the current environment, one of the important measures undertaken to improve quality of health care is adoption and use of computers and information technology such as electronic medical records system (EMR) by health care providers and medical institutions.

Introduction of EMR has received considerable attention because of its potential effectiveness in (a) implementation of decision support, (b) reducing practice expenses, (c) increasing revenues by improving office efficiency, and (d) making health records more up to date, accessible, legible, and modifiable (Gill, Ewen, & Nsereko, 2001; Hippisley-Cox, Pringle, Carter, Wynn, Hammersley, & Coupland, 2003; Singh, Servoss, Kalsman, Fox, & Singh, 2004).

Even though a few studies in the literature have tried to examine the usefulness of EMR at organizational level (Gill et al., 2001; Hippisley-Cox et al., 2003; Miller & Sim, 2004; Singh et al., 2004), very little research has been done on examining the various components of EMR systems and the process level benefits of these systems. As Barua, Kriebel, and Makhopadyay (1995) point out, by attempting to relate IT implementation directly to output variables at the organizational level, the intermediate processes through which IT impacts are felt are totally ignored. When information technologies such as EMR systems are deployed effectively, they interact with intermediate organizational processes, and deliver value by building unique process level benefits, which finally result in organizational level outcomes. Therefore, there is a need for more granular studies that explicate the underlying linking mechanism (process) between IT implementation and organizational level impacts (Radhakrishnan, Zu, & Grover, 2007).

In this article, we pursue this line of thought and examine the various components of EMR and the potential

process level benefits of EMR systems by presenting case summaries. This article contributes to the literature and practice in two ways: First, it provides insights into various modules of EMR system and how they interact with each other to bring out value to users. Second, we present six case summaries (based on qualitative case analysis and content analysis of Web sites) to illustrate the potential process level benefits of EMR systems. The remainder of this article is organized as follows. The next section provides an overview of EMR and its components. In the following section, we present six case summaries to illustrate the potential process level benefits of EMR systems.

## **OVERVIEW OF EMR**

### **What is EMR?**

Electronic medical records system (EMR) is defined as an interorganizational information system that captures the essential components of a patient's medical encounter with the medical provider, including storage and retrieval of subjective, objective patient information, and assessment and plans for patient care (Lenhart, Honess, Covington, & Johnson, 2000). EMR systems facilitate physicians and other health care professionals to:

- Monitor the health status of their patients with electronic medical charts.
- Support health care decisions with evidence-based guidelines.
- Expedite referrals to specialists and other health care providers.
- Computerize ordering of prescription drugs, laboratory tests, and radiology results.
- Store and retrieve patients' medical records from different locations.

### **Why EMR?**

While conducting a field study involving hospitals in countries such as UK and USA, Lederman (2005) found that there are several problems faced by health care professionals while handling patients' medical records. These problems are listed below:

First, in many hospitals, only paper-based records are maintained. Management of paper-based records

becomes a significant problem due to the possibilities of losing or misplacing records.

Second, data inconsistency and data integrity are other problems related to paper-based records. Patient files can be changed with no assurance that changes made would be incorporated into a central repository or vice versa. This could lead to a possibility of different, conflicting records being held for the same patient. This increases the probability of incorrect information being accessed.

Third, nonintegrated databases across hospitals pose a significant problem, providing a major impediment to collection, access, and ability to view patient records. The medical staff in each hospital manually enters patients' records into the system. This may cause potential problems like inefficient use of time, loss of productivity, and data entry errors.

EMR can help in overcoming these problems (Bria, 2006; Doyle, 2006; Simon & Simon, 2006). In a survey of 703 practicing family physicians in the U.S., Karsh, Beasley, and Hagenauer (2004) found that the physicians preferred electronic medical records to paper based records as they were up to date, modifiable to meet individual needs, accessible when needed that resulted in better record quality. These studies highlight the value of EMR systems.

## **Components of EMR**

An EMR system has several different modules. Organizations can implement specific modules or all the modules depending upon their needs.

### **Patient Registration Module (PRM)**

This module helps with patient's registration. It helps track and maintain relevant details on the patient (such as name, date of birth, address, contact number, financial class), health insurance plans (insurance company, type of insurance policy, and level of copay), and historical as well as scheduled appointments.

### **Appointment Scheduling Module (ASM)**

This module helps with scheduling appointments. Appointment reservations are scheduled for specialists, general practitioners, and for other resources such as medical labs, emergency rooms, operation theaters, and so forth. It provides flexible appointment schedules

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