

Chapter 3

Optimizing the Use and Adoption of Healthcare Information Systems: A Systematic Review

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ABSTRACT

Advancements in Information and Communication Technology (ICT) have led to the development of various forms of electronic records to support general practitioners and healthcare providers in capturing, storing, and retrieving routinely collected medical records and/or clinical information for optimal primary care and translational research. These advancements have resulted in the emergence of interoperable Healthcare Information Systems (HIS) such as Electronic Health Records (EHRs), Electronic Medical Records (EMRs) and Personal Health Records (PHRs). However, even as these systems continue to evolve, the research community is interested in understanding how the use and adoption of HIS can be optimized to support effective and efficient healthcare delivery and translational research. In this chapter, a systematic literature review methodology was used not only to explore the key benefits and technical challenges of HIS, but also to discuss the optimization approaches to maximizing the use and adoption of HIS in healthcare delivery.

INTRODUCTION

Advancements in Information and Communication Technology (ICT) have led to the development of various forms of electronic records to support general practitioners and healthcare providers in capturing, storing, and retrieving routinely collected medical records and/or clinical information for optimal primary care and translational research. These advancements have resulted in the emergence of interoperable Healthcare Information Systems (HIS) such as Electronic Health Records (EHRs), Electronic Medical

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Record (EMRs) and Personal Health Records (PHRs). However, even as these systems continue to evolve, the research community is still interested in understanding:

- What constitutes Health or Healthcare Information Systems?
- What are the key benefits, challenges, and obstacles of using Health or Healthcare Information Systems?
- What optimization techniques and approaches can be used to maximize the use and adoption of Health or Healthcare Information Systems in healthcare delivery?

HIS are powerful ICT-based processes, tools and applications that support effective and efficient healthcare delivery and translational research (Rodrigues, 2010). HIS have the potential to not only support seamless exchange of clinical information, but also improve both service efficiency and effectiveness for both inpatient and outpatient services (Harrison & McDowell, 2008). Hence, the need for optimizing HIS is of great essence in the healthcare industry.

The objective of this paper was to use a systematic literature review methodology not only to explore the key benefits and technical challenges of HIS, but also to discuss the optimization approaches to maximizing the use and adoption of HIS in healthcare delivery. The first part of the paper describes the systematic review methodology. In the second part, the focus is on the overview of HIS and their associated key benefits and challenges in the healthcare domain. The third part focuses on the optimization techniques and approaches to maximizing the use and adoption of HIS to support effective and efficient healthcare delivery and translational research.

METHOD

A systematic literature review, based on peer-reviewed articles from 2000 to 2014, was used not only to explore the key benefits and technical challenges of HIS, but also to discuss the optimization approaches to maximizing the use and adoption of HIS in healthcare delivery. The methodology involved a systematic review of relevant peer-reviewed publications, found and accessed with the help of ProQuest (with multiple databases option) and EBSCOhost databases. Additional sources were retrieved using the SAGE Journals Online, ScienceDirect, PubMed, Google Scholar, and ACM digital libraries. The targeted search terms consisted of the combination of keywords and/or phrases including: (a) healthcare information systems; (b) health care information systems; (c) health information systems; (d) health AND/OR healthcare AND/OR health care AND information systems; (e) healthcare information systems AND benefits; (f) healthcare information systems AND challenges; (g) healthcare information systems AND optimization techniques; (h) information systems AND evaluative methods; and (i) information technology AND evaluative methods.

Overall, 198 abstracts were screened and 40 of them were reviewed in full. Findings from the reviewed articles were synthesized, paraphrased and categorized under three broad themes: *Overview of Healthcare Information Systems*; *Key Benefits and Challenges of Healthcare Information Systems*; and *Optimization Approaches to Healthcare Information Systems*. Studies were included in the analysis if they reported not only on key benefits and technical challenges of HIS, but also discussed the optimization approaches to maximizing the use and adoption of HIS in healthcare delivery. The inclusion criteria also required that the selected full-text articles were (a) published in English language; (b) published in the

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