Trends of optimization post EHR implementation in hospitals

Introduction
Optimizing EHR systems is an important step following implementation for healthcare organizations. Spurred by the HITECH Act by financial incentives, the adoption rate of EHR systems for hospitals has been increasing significantly. In 2013, nearly 60% of acute care hospitals in the United State had adopted an EHR system (Charles, Gabriel, & Furukawa, 2014). Despite the increasing adoption rate, a recent survey reveals that more than 40% of hospitals are dissatisfied with their current EHR systems (Premier, 2014). The result indicates there is a substantial room for improvement of current EHR systems. Given the maturing EHR implementation phase, healthcare organizations are heading toward the final step of an EHR implementation called "optimization," which means using the system as effectively and efficiently as possible (The Office of the National Coordinator for Health Information Technology, n.d.). Most health IT leaders acknowledge that implementation and optimization are quite different, saying: "It's one thing to go live and a completely different thing to see it through" (Leventhal, 2014). Some early adopters of EHR systems emphasize the importance of the optimization process even before implementing an EHR system (Leventhal, 2014). Despite its significance, little is known about optimization. There are very few documented studies of EHR optimization. The majority of EHR studies, including studies on unintended consequences associated with EHR systems, are all about EHR implementation. Few studies have attempted to understand or describe how hospitals move beyond implementation of EHR systems.

Research Questions
The limited research into optimization pose me serious questions: What do healthcare organizations do with implemented EHR systems to demonstrate the benefits of the deployed systems and to deliver clinical and financial results? What advancements are hospitals making post go-live? Are there patterns of optimization processes in acute healthcare settings?

Specific Aims
To find answers to the research questions, I will investigate what leading acute hospitals are doing (have done) with their implemented EHR systems to leverage the implemented EHR systems. Specifically, I will look for processes and (or) initiatives they are undertaking (have undertaken) to improve quality and efficiency with the deployed EHR systems. I will also seek to identify barriers to and facilitators for such advancements. Overall, I aspire to understand and describe optimization processes and (or) initiatives that leading hospitals have been undertaking with their implemented EHR systems.

Significance
My study is broadly aligned to support adoption and use of EHR systems to improve the quality and efficiency of healthcare. I believe my study is significant, for rich description of EHR optimization can provide healthcare organizations a road map to leverage their own EHR system in the post go-live phase. The report on optimization may also benefit other healthcare organizations that have not yet implemented an EHR system. The report may provide them
valuable information that helps establish a plan for both implementation and optimization phases.

**Research Methods**

**Selection of Sites:** For the qualitative study, in the first place, I will generate a list of potential study sites from a variety of sources, including 1) published literature; 2) HIMSS (Healthcare Information Management Systems Society) Davies Award winners from the last seven years; 3) Hospital and Health Network's benchmark survey of Most Wired hospitals; and, 4) referrals/recommendations from academic advisors. From the refined list, I will select six study sites (N=6), based on my subjective assessment of demonstrated strength in using EHR systems post implementation, characteristics of hospitals, such as location, size, and EHR vendor type, that ensure variation of samples, input from my academic advisors, and practical considerations.

**Data collection:** Key informants from select sites include clinical information systems directors, organizational executives, medical directors, managers, physicians, nurses, clinical staff, finance and accounting personnel. At each study site, I (my research team) will conduct in-depth interviews with at least seven key informants. The interviews will last between 30-60 minutes, based on in-depth interview guidelines compromised of open-end questions including:

- What has your organization been doing to leverage the implemented EHR system?
- What process improvements/initiatives are undertaken in your organization by using the implemented EHR systems?
- What results/outcomes has your organization been seeing through these efforts? How are the outcomes significant to your organization in the context of meeting Meaningful Use requirements and beyond?
- What are barriers and facilitators you have seen during EHR optimization? How has your organization overcome the barriers and increased momentum of the facilitators?

In addition to in-depth interviews, I will also conduct one focus group discussion at each study site, based on in-depth focus group guidelines. The focus groups, including six key informants, will last 60-90 minutes and will be led by a facilitator and an assistant. Both interviews and focus groups will be recorded and transcribed for later analysis. The amount of collected data will include at least 42 interviews and six focus groups in total.

**Analysis:** For data analysis, I will use a grounded theory approach (Strauss & Corbin, 1998). First, I will repeatedly review/listen to the transcripts for a full familiarization of findings, followed by in-depth discussions throughout the data collection process. Second, I will establish a preliminary coding guide, identifying broad themes emerging from the interviews and focus groups and the transcripts. Third, I will develop a comprehensive coding guide, identifying sub-themes and relationships between themes and sub-themes. In order to clarify codes and to ensure their consistency, I will test the complete coding guide by comparing my coding results from three identical transcripts with coding results done by others. Any identified problems will be resolved, refining the complete coding guide before applying it to the collected data. Fourth, I will interpret the coded data, relating emergent themes and sub-themes for the research questions and exploring patterns. To strengthen my analysis, I will have frequent and in-depth discussions with peers and other researchers throughout the analytic process. Additionally, I will iterate my
data analysis process excessively. To support detailed coding and analysis, I will use qualitative data analysis software ATLAS.ti (v.7.1.8).

**Research Schedule**
I will conduct the study over twelve months, beginning on September 1, 2014, with four phases.  
**Phase I (09/01/2014–10/24/2014):** Literature review and research site selection: My objective for the first phase is to conduct a comprehensive literature review and complete the study site selection.  
**Phase II-A (10/27/2014–11/14/2014):** Data collection (A): My goal in the second phase is to complete three preliminary in-depth interviews and refine interview/ focus group guides. Schedule for interviews and focus groups for the coming month shall be completed as well.  
**Phase II-B (11/17/2014–02/20/2015):** Data collection (B): In this data collection phase, I will conduct all scheduled in-depth interviews and focus groups at all select sites.  
**Break (02/23/2015–02/28/2015: one week):** I will not be working.  
**Phase III (03/02/2015–07/03/2015):** Data analysis: Following data collection, my goal is to identify and understand patterns and trends of EHR optimization in sample organizations through a robust analytic process.  
**Phase IV (07/06/2015–08/31/2015):** Writing/ publishing findings: Following the data analysis, I will write up the study findings, which I intend to publish in peer-reviewed journals.

**Limitations**
First, due to the limited sample size, generalization of study findings may not be plausible. From the initial planning phase, I intended this study to be my possible scholarly project. So, I have strived to design a small-scale study that I (and my team) may actually carry out. The limited sample size is, however, offset by the large number of informants in each organization. Further, there might be bias on interpretation and findings of the study subjects. This limitation is caused by both a grounded theory approach and a very limited number of researchers—perhaps only myself or a small team. An extensively iterative process and validation of findings with academic advisors will be done to help alleviate this limitation.
References


