The Critical Link of CPOE and Patient Safety

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ABSTRACT

Underlying patient safety concerns is the gap between management and clinicians. The Computerized Physician Order Entry (CPOE) and support systems are creating a bridge, linking the two divisions and potentially integrating a fragmented healthcare industry. The IT systems provide discipline with quality control thus reducing medical errors. These IT-driven systems can further link entire healthcare systems. Through successful implementation of IT-driven processes emerges a healthcare network with a focus on patient safety. Without proper acknowledgement and cooperation, successful implementation is difficult. Both clinicians and management must work towards the same goal: increase patient safety. However, unless one sector understands the other and is able to develop measuring standards, our endeavors cannot reach their full potential and our goal remains unfulfilled. This paper addresses an emerging means of linking clinicians with management using a market model to monitor progress.

MEDICAL ERRORS AND THE CPOE

Medical errors and adverse drug effects are some of the major concerns in healthcare industries for both healthcare providers as well as administrative professionals (Potts, Barr, Gregory, and Patel, 2004). The Institute of Medicine reported that an estimated 44,000 to 98,000 of patient deaths result each year from medical errors in American hospitals. Approximately, $17 billion of the $37.6 billion cost in medical errors can be prevented (Notturno, Firestone, McElroy, Murray, 2004). According to the KMCI Research Center, the problem is social as well as scientific essentially underlying knowledge management, epistemology and philosophy of science (Notturno et al, 2004).

The CPOE system reduces medication errors and adverse drug effects. Inadequate availability of patient information, such as timely laboratory results, was directly asscoaited with nearly 18 percent of events involving adverse drug effects (Leape et al, 1995). Studies in a pediatric critical care unit also showed positive results of its usage.

Nearly all medication prescribing and rules violation errors were eliminated while adverse drug effects decreased by 40.9% (Potts et al, 2004). Other benefits of the CPOE are transferring information instantly, reduced time for delivering medication, processing and scheduling laboratory examinations (Wolf, 2003). Additionally, communication among healthcare professionals was enhanced by the use of the CPOE system. Furthermore, implementing decision support with CPOE showed increased effectiveness (Potts et al, 2004). According to Wolf, decision support guides people to recognized best practices. If the benefits seem to be so great for CPOE and decision support systems, then why aren't more healthcare professionals implementing the IT-driven processes? The Canadian Healthcare Technology identifies physician change and workflow change management as obstacles to CPOE-type systems in addition to complexity and high financial costs.

Evidence computer-based medicine and evidence-based informatics have been the current trend in health informatics with emphasizing safety and quality of healthcare. It has been recommended that medical care should be based as much as possible on the best available evidence from the scientific research rather than on expert's opinions or physician's own experience. Therefore, literature search from published materials is essential for evidence-based practices.

The quality of health information on the Web is very important. Wang and Strong (12996) identified data/information quality as data that are fit to be used by data consumers. Studies indicate that consumers surf the web for health information to find out more information about treatments and to assist in healthcare decision making. Therefore, it is imperative that information available on the web should serve to fulfill these requirements. Moreover, information available should have all data quality attributes such as accuracy, accessibility, consistency, timeliness and so on (AHIMA, 1998). In health domain, inaccuracy or error in information can have tremendous impact on a person's health and it is important that the information available is of high quality information. Information quality is generally defined as "fitness for use, "meets information consumers needs", or "user satisfactions" (Naumann, 2002). Attributes of information quality have been identified by (Naumann, 2002, Wilson, 2002). Relevancy and accuracy are most important information quality attributes to be considered in the information retrieval on the web. In this research, our measurement of the information quality is based on these two important attributes.

BUSINESS AND HEALTHCARE

Is anyone pleased with the healthcare industry? Should hospitals function as other businesses do? Patients are unsatisfied with costs to them, quality and errors. Managers must deal with uncontrollable costs and government regulations; they may perceive clinicians as being uncooperative. Clinicians, concerned with responsibility lacking appropriate authority, deal with hassles in trying to deliver quality, care, and declining income (Waldman, Smith, and Hood). The solution to these rising issues turns toward increased quality and cost control. Interestingly, people view a hospital's performance

comparable to other businesses: higher costs mean inefficiency (Waldman, Smith, and Hood).

Unfortunately, leadership is blamed for the shortcomings in finances. By setting long-term population health as the goal, healthcare leaders change the current outlook into a focused whole system output (Waldman, Smith, and Hood). At present, physicians are judged by productivity ascertained by number of patients seen in a day (Waldman, Smith, and Hood). However, managers are responsible for financial performance but cannot measure or control good outcomes. Therefore, a system restructure is needed. Also according to Waldman, Smith, and Hood, "when patients get better or errors are minimized, the doctor wins, resources are optimally utilized, and investors make money." With an effective corporate culture set on facts, managers and clinicians can monitor performance, learn, and improve results (Waldman, Smith, and Hood, 2003).

As a result, one sector cannot resolve the issues integrating business and healthcare alone. Nevertheless, a combined effort of healthcare professionals within the realm of business processes can alleviate internal and external pressures. The CPOE and decision support is a tool for cost saving and improvements in quality of care (Wolf, 2003).

MANAGEMENT & CLINICIAN SUPPORT

Once patient safety issues are recognized by the corporate culture, including all healthcare professionals, the discontinuity results from implementation obstacles. Ongoing costs of CPOE and altered clinician workflow such as switching from handwritten to computerized orders are two barriers. IT-driven processes change the way clinicians work which can cause clinicians to be hesitant in accepting CPOE-type systems.

According to Daniel, based on interviews of early CPOE adopters, "strong executive vision; a realistic strategy for gaining physician commitment; a spirit of collaboration among medical staff, hospital administration, pharmacy, nursing and IS; and sufficient resources" are needed for success. Relationships between clinicians and senior management influenced the success or failure of efforts in quality improvement (Bradley, et al 2003). Furthermore, patient safety improvements rely on encouraging environments that not only identify errors, but also evaluate them and function to improve future performance (Notturno et al).

Senior management are the avenue to acquiring and allocating quality improvement resources while establishing positive working relationships with physicians and medical staff (Bradley et al). "The reason some CPOE implementation attempts fail is because the initiative is treated as in IT department project, not a broad organizational effort backed by executive and physician leadership" (Wolf, 2003). In essence, the Journal of Healthcare Management describes high performance hospitals as being "consensus driven." These hospitals have shared goals and cooperation among departments for quality improvement (Bradley et al, 2003).

ASSESSMENT

The long-established traditional role of managers and healthcare providers will not suffice in the healthcare industry. Both divisions must merge to a common goal and strategy with the priority set on patient safety and developing standards. Medical errors have grown to an alarming peak while management and clinicians distantly tackle the issues. This gap has to be bridged in order to overcome obstacles within a highly fragmented industry. Measuring safety and quality standards of clinicians and quantifying results for management is difficult. The Computerized Physician Order Entry system and decision support systems help establish a method of discipline that brings understanding of each division to the other.

Management ←→CPOE & Decision Support ←→Clinicians

Several barriers hinder successful implementation of IT-driven processes. However, the key is establishing a corporate common goal and strategy for all healthcare professionals enhanced by communication. Management and clinicians have an augmented social responsibility. In order to address this responsibility, they must first unite and the missing link can be IT-driven processes such as CPOE systems with decision support.

Understanding clinician and management dependencies on each other leads to establishing a model for monitoring patient safety. Once management and clinicians develop a combined effort to increase patient safety, they likely go through a series of stages. Organizations such as the Leapfrog and government regulations will drive conventional standards requiring all healthcare facilities to adopt certain practices. Healthcare providers must be one step ahead, monitoring their environment and shaping their road. Depending on which stage an organization finds itself, healthcare professionals can take the likely approach to become the leaders guiding the social responsibility. A market model can be used to recognize market conditions and predict future conditions with advancements in safety standard measures (Shulkin, 2003)

THE MARKET MODEL

Shulkin (2003) developed a market model with four stages to track advancements in patient safety. According to Shulkin, reducing medical errors and patient safety are one of the top two issues faced by upper management.

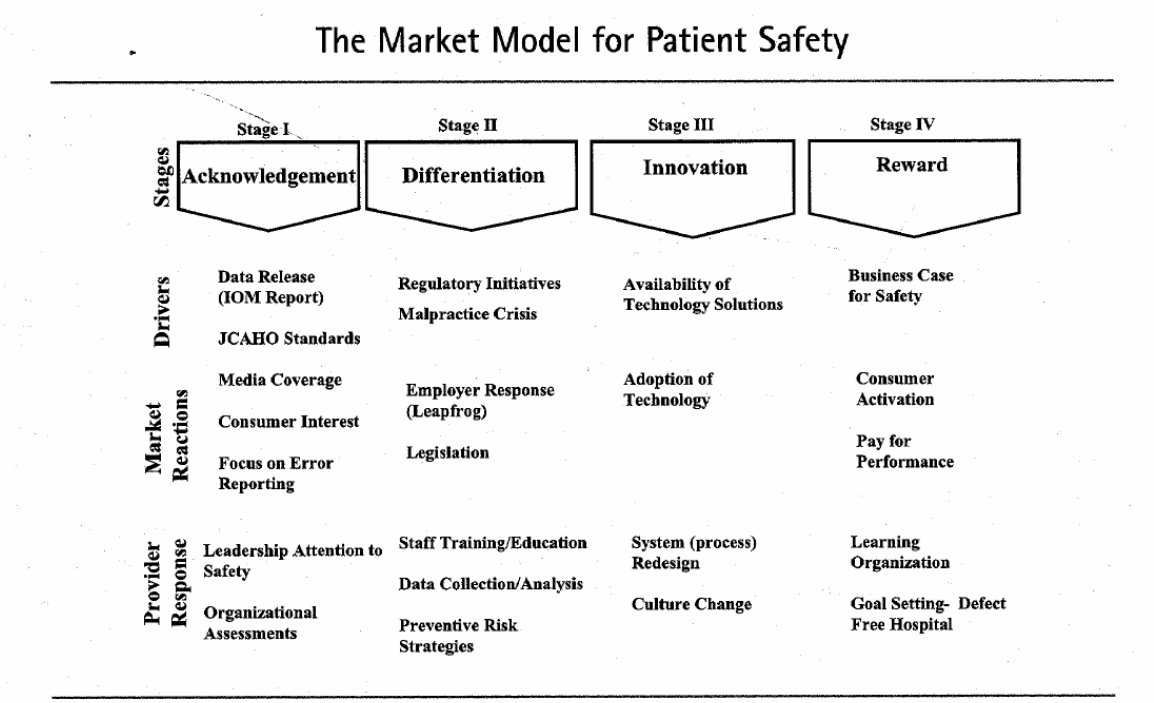

Figure 1. *The market model has four stages and is predicated on a hospital fitting into one of the four market stages at a point in time.*

Shulkin (2003) produces a national map showing where each state stands according to this model. Unfortunately, most states are still in stages I and II. Stage 1 is marked by acknowledgement of patient safety concerns by healthcare leaders. The public requires improved medical error reporting, holding providers responsible for their actions. Awareness can be increased through committees which develop plans for such a cause. Stage II begins with initiatives towards implementing patient safety improvements. Market conditions are driven by cost of malpractice insurance and whether it is available. Medical errors are countered by intervention responses. Hospital staff training and educational means are implemented to increase awareness in patient safety.

Stage III is marked by redesign of the structure for patient safety improvements. The computerized physician order entry is an example of this stage. Effort results are often seen for the first time. Stage IV is marked by rewards. Organizations are recognized for safety improvement performance. CPOE systems reduce adverse drug events by 28%-95%. Therefore, Stage IV states (New York, California, and Minnesota) offer providers differential payments. With increased reward and recognition, consumer demand should increase; thus, consumer choice will shift and become a business driver. The Stage IV healthcare facilities are likely to become learning organizations which can be a continuum for improvement (Shulkin, 2003).

In conclusion, one of the most valuable direct benefits of CPOE emergence on a global scale is the impact it will have on health care. As medical technologies and processes emerges in conjunction with market-driven IT will provide, support, and extend healthcare delivery. Patient safety and reduced medical errors have become market

drivers. Healthcare organizations must at some point address these issues. Early adopters can drive the market and establish standards before regulations are imposed upon them. The healthcare industry is dynamic and highly fragmented. Advancements towards evidence-based medicine, discipline and quality control can occur through successful implementation of IT-driven processes. As more healthcare providers become interconnected through IT-driven systems, a network of healthcare organizations emerges which may be able to address a continuum of improvement.

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