

# Electronic Health Records and Change Management

William Martin,  
Department of Management  
DePaul University  
Chicago, USA  
Email: martym {at} depaul.edu

Sergey Voynov,  
Practice Management  
Northshore Medical Center, LLC  
Buffalo Grove, USA

**Abstract—** Electronic health records (EHRs) offer many potential opportunities for patients, payers, physicians, and other healthcare providers. These opportunities are only realized if healthcare organizations commit to investing in EHRs and providers adopt the new technology for the benefit of patient care, higher quality, fewer errors, and greater efficiency. This paper focuses on increasing the probability those healthcare organizations in general but physicians and providers in particular adopt EHRs as a valuable tool to prevent and manage disease and illness. The adoption of EHRs often has less to do with the technology and more to do with the underlying changes in business/clinical processes, work flow, and daily tasks. Two models of change are presented, Technology Acceptance Model (TAM) and Kotter’s Leading Change Model, to guide leaders in the adoption of EHRs in medical groups. A case study is used to illustrate the eight steps outlined in Kotter’s Leading Change Model beginning with establishing a sense of urgency to anchoring new approaches to the culture of the medical group. This paper ends with an invitation for future researchers to identify with greater specificity some of the key variables distinguishing a smoother versus a choppy installation and adoption of an EHR in a medical group or other type of healthcare organization.

## I. INTRODUCTION

Across the globe, healthcare organizations are seeking to improve quality, contain costs, and make care more accessible and safe. One of the strategies to achieve these health policy objectives is to fully leverage the use of electronic health records (EHRs). This emergence of ehealthcare is not limited to developed nations, but is also occurring in developing countries [1]. Schutznak and Fernandopulle (2014) write, “The digital age of medicine is upon us.” The focus here will be on examining the adoption and utilization of EHRs in small outpatient physician practices in the United States, given three federal laws which have catalyzed a significant change in their implementation and use: (1) The Health Insurance Portability and Accountability Act (HIPAA) of 1996, (2) the Health Information Technology for Economic and Clinical Health Act (HITECH) of 2009, and (3) the Patient Protection and Affordable Care Act (PPACA) of 2010, also known as the ACA.

The HIPAA of 1996 promulgated standards for both the electronic exchange of information, and more importantly, the security of protected health information [3]. In 2009, the HITECH Act was enacted. This Act established requirements for meaningful use and the nomenclature of a certified EHR [4]. If individual clinicians demonstrate meaningful use, they can receive as much as \$44,000 from the United States government under Medicare, which is the health plan that serves the elderly (65 and older) and the disabled. The Affordable Care Act (ACA) further strengthened the incentives for not only establishing but also fully leveraging, EHRs [5].

Decker, Jamoom, and Sisk (2012) found that the rate of adoption of EHRs in the outpatient setting of physician practices has been slower than other settings, such as hospitals. However, Hsiao and Hing (2012) found that 72 percent of office-based physician practices implemented an EHR. In fact, small practices represent the largest proportion of all practice types [8]. The adoption of EHRs in outpatient practices is largely dependent upon clinicians [9].

The aim of this article is to first describe, and second, apply Kotter’s change management model to the implementation of an EHR in small physician practices in the outpatient setting. This work rests upon the foundation of earlier work that applied this change management model to the implementation of EHRs in a family practice setting [10], using a systematic review [11] that aligned EHR implementation with quality improvement [12]. Dimitrovski, Ketikidis, Lazuras, and Bath (2013) discuss the need to integrate the Technology Assessment Model (TAM) with other theory-based models of physician acceptance of EHRs. In short, intentions, attitudes, and beliefs about perceived usefulness (PU) and perceived easiness of use (PEOU) are critical to complement any change model of HER acceptance and adoption. Social and behavioral factors must be addressed in EHR planning. Furthermore, the benefits of eprescribing in particular and EHR in general have been categorized as falling into three domains: quality of care, access to care, and effectiveness of care delivery [14]. This is the case here. The methodology used in this article is similar to that of [15], who used a case study to describe the application of Kotter’s change management model to improve cost efficiency among physicians.

### A. *Quest for Value-Based Health Care*

Research is now beginning to explore the forces that resulted in the implementation of EHRs, as well as the outcomes of different key performance indicators, ranging from compliance to the improvement of clinical outcomes. In one investigation, it was found that medical group practices faced the following pressures: incentives, relationships within the organization, and access to resources [16]. Additionally, it was demonstrated that leadership and the culture of the medical group made a difference in the implementation of improvement efforts, including EHRs [16]. In a recent investigation related to the financial return on investment of an EHR, it was found that slightly more than one quarter (27 percent) of physician practices would experience a positive financial return [17]. Two factors were identified that seemingly differentiated those practices that reported a positive financial return from those that did not: (1) an increase in the number of patients seen each day, and (2) an improved billing process that captured more revenue by decreasing the percentage of rejected claims [17].

## II. BRIEF REVIEW OF LITERATURE: ELECTRONIC HEALTH RECORD ADOPTION AND CHANGE MANAGEMENT

The success rates for clinical information system implementation are less than one in three (28 percent), according to Morton and Wiedenbeck (2010). This high rate of failure is similar to the high failure rates for organizational change initiatives overall [19, 20]. Morton and Wiedenbeck (2010) wrote, “creative change management strategies will be essential (page 5),” in reference to the acceptance of EHRs in ambulatory settings. Appelbaum, Habashy, Malo and Shafiq (2012) acknowledged the limitations of Kotter’s Change Management model, and recommended using this model in combination with other models of change, such as the Technology Acceptance Model [TAM] [22]. TAM is a useful complement to Kotter’s Model of Change because it focuses upon the perceptions of the group undergoing the change in relation to specific variables such as perceived usefulness and ease of use [23].

## III. THEORETICAL UNDERPINNINGS: KOTTER’S CHANGE MANAGEMENT MODEL

The administrative leadership of Northshore Medical Group, LLC followed Kotter’s eight-phase approach [24] for change. The first stage of this approach is for leaders to establish a sense of urgency; this may be accomplished through either the burning platform or the aspirational platform. This stage is followed by the creation of a guiding coalition to lead and develop the change. The third stage involves the development of a vision and strategy. This stage must be followed up by giving voice to that vision and strategy. The fifth stage is to empower broad-based action that encourages risk taking. The sixth stage is to generate short-term wins, and to celebrate those wins. Once these gains are established, they must be consolidated, producing further change, which is the seventh stage. Finally, the last,

or eighth stage, is to anchor new approaches in the culture of the organization. It was concluded that applying this change management model was likely to increase the probability of success of a change effort [25].

## IV. APPLICATION OF KOTTER’S CHANGE MANAGEMENT MODEL

### A. *Setting*

Northshore Medical Center, LLC, a multidisciplinary physician group practice, is located in a suburb of Chicago, Illinois. The Center was founded nine years ago, and is one of the few physician practices accredited by the Joint Commission. The payer mix consists of cash and commercial insurance. The Center cares for about 60 patients each day and performs six to eight surgeries per week.

### B. *Create a Sense of Urgency*

The President and Medical Director of Northshore Medical Center, LLC were initially indifferent about the benefits of an EHR. However, the practice manager and biller were not. In fact, they were motivated to address several problems facing the practice, including, but not limited to, the following: (1) lack of physical space to store medical records; (2) usage of physical space for medical record storage, rather than using the space for clinical and other higher value administrative activities; (3) foregoing the financial incentives for implementing an EHR; (4) wasting time and effort in finding lost medical records; and (5) relying upon several databases and spreadsheets to manage information and manage the practice clinically, operationally, and financially. These problems represent the perceived usefulness (PU) of the EHRs using the TAM model [26]. Another driving force was the amount of money that could be earned from the US government if Northshore Medical Group, LLC could document “meaningful use” of the EHR once implemented, adopted, and leveraged. If the Group waited an additional year to implement the EHR, then it would only be paid \$29,000 per physician, rather than \$39,000 per physician, and the Group had already lost the maximum incentive of \$44,000 per physician for waiting too long. Tom, Fox, Trepel and Poldrack (2007) found that individuals feel a loss more than a gain of the same amount. This is called loss aversion, and can motivate individuals to make decisions and act to prevent any further losses. Such was the case here. All of these factors together served as the spark for the practice manager and the biller to recognize this situation as a “burning platform”. Given the indifference by the President and the Medical Director, the practice manager and biller were given carte blanche to move forward with this initiative.

An announcement was made by the manager of the practice that Northshore Medical Center, LLC would be implementing an EHR. Three groups of employees organized around this announcement: (1) the physicians, (2)

the allied health staff, and (3) the administrative staff. The physicians were not committed one way or the other, but needed to experience the EHR and its benefits to decide whether to implement it, fully utilize it, or go back to paper charts. The physicians responded in a way that was similar to the President and Medical Director. On the other hand, the allied health staff, including laser technicians and medical assistants, many of whom were in their 40s and 50s, were so opposed that some threatened to quit the practice. The basis of their vociferous complaints was that the learning curve was too challenging. Hence, based upon TAM, perceived ease of use was a barrier for the allied health staff. Finally, the administrative staff—billers, receptionists, and administrators—were ready for something other than tracking down missing charts, navigating through hundreds of medical charts, and swinging back and forth from multiple spreadsheets to manage the information deluge of the practice.

### *C. Form a Powerful Coalition*

Once a sense of urgency was communicated, a guiding coalition was established, consisting of the manager and biller. This coalition was charged with identifying all restraining and facilitating forces to successfully implement the EHR with minimal disruption clinically, operationally, and financially. An illustrative example of how the guiding coalition worked with others at Northshore was during the onsite training provided by the EHR vendor. The members of the guiding coalition sat in the front room during the training, and translated many of the concepts to those individuals who actively resisted the EHR, such as the medical assistants and laser technicians. This active involvement on the part of the guiding coalition is an example of trying to increase perceived ease of use (PEOU) which is one of the two goals of TAM. Interestingly, the administrative team was demonstrably engaged in the EHR training, which signaled to the allied health staff that this initiative was important, and that participation in the training and adoption of the EHR was not optional.

### *D. Create a Vision for Change*

The vision for change after the implementation of the EHR was that Northshore Medical Center, LLC would become leaner. The EHR was not the end goal, but a means to an end. The relationship between leanness and quality, as well as EHRs, has been discussed elsewhere [28, 29]. The importance of creating and communicating a vision for change for successful EHR implementation in small ambulatory practices has been noted by others [30].

### *E. Give Voice to Vision*

This vision was established by the practice manager and biller, and was initially communicated to the President and Medical Director. Then, the manager and biller had one-on-one conversations with each member of the team. A constant theme throughout the EHR implementation was that it represented not just a project, but a major shift in the culture

of the organization. The immediate benefits communicated to the physicians ranged from enhanced diagnostic to monitoring tools as a way of improving patient care, increasing revenue, and decreasing exposure to malpractice liability. The immediate benefits to administrative staff were also communicated, which included the following: (1) fewer missed appointments and double bookings, (2) less time trying to find missing records, (3) less time entering data into spreadsheets, (4) less time duplicating data entry from one system to another, (5) more transparent billing, (6) a better and faster method to track paid/unpaid and sent/not sent claims, and (6) the possibility for several people to work with the same patient's chart at the same time.

### *F. Empower Broad-Based Action*

The practice manager and biller ensured full participation at Northshore Medical Group, LLC by involving members of the most resistant group, the allied health staff, who did not see any immediate or direct benefits in comparison to the physicians and administrative staff. Wiener and Fagerhaugh (1985) found that small medical groups sought to reestablish equilibrium sooner than larger healthcare organizations. This was the case at Northshore.

The allied health staff were engaged in the process of implementing the EHR by utilizing the following approaches: individual and group training; setting up dummy patients in the system as a way of simulating how an EHR works; watching training videos as a group and supporting one another; and running meaningful use reports to see how each individual and the practice was performing, emphasizing what could be learned and improved, rather than who was at fault. The practice manager and biller also emphasized that individuals and the group would be recognized formally and informally for achieving specific, agreed upon milestones toward implementing the EHR. This spotlight on recognition acknowledged that an EHR implementation is a marathon, not a sprint. In fact, Adler wrote, "Learning how to use an EHR is a lot like learning a musical instrument. You do not just pick it up the first day and expect to be a virtuoso" [31].

### *G. Generate Short-term Wins*

The timeline for the EHR implementation began on October 1, 2013, and ended on December 31, 2013. During this period, several milestones were established to signal achievement toward the goal. Examples of milestones included meeting the core and menu measures of meaningful use, such as maintaining an active medication allergy list. This particular measure required the physician to enter any patient allergies to specific medications into the EHR. This is important from a safety standpoint in order to prevent an adverse outcome resulting from the prescription of a medication to a patient with a known, documented allergic reaction. EHRs are essential to improving patient safety [32]. Moreover, in one study, physicians in a group practice perceived that implementing an EHR and redesigning

processes resulted in a greater patient safety culture [11]. These are indicators of early wins. Ford, Heisler and McCreary (2008) likened these early wins to proof that the vision was indeed accurate, and that the change was necessary.

#### *H. Consolidate and Produce More Change*

The early wins were consolidated by management meetings. Every second Monday, staff met to discuss and report meaningful use achievement and issues. This provided forward-moving energy to achieve more challenging milestones, such as menu set measures. For example, one of the menu set measures was Careplan. The EHR has the capability to give each patient an educational printout about their diagnosis or post-procedural instructions after their appointment or procedure. Since the core measures were more difficult to meet as a practice, we began with these measures, and then moved toward the implementation of easier measures as competence and confidence were gained. An increase in perceived competence and confidence among those having to implement the change, as well as those being impacted by the change, increases the change efficacy within an organization. Shierhout and colleagues have posited that change efficacy is instrumental in an effective change management initiative within healthcare organizations.

#### *I. Anchor New Approaches in the Culture of the Organization*

The implementation of the EHR at Northshore was initially conceived as a method to improve operational efficiency and capture revenue lost from poor medical record keeping. Now, after five months of implementation, the nature of work has permanently changed from 100 percent paper-based medical record keeping to 100 percent electronic medical record keeping bundled with 100 percent electronic billing and eprescribing. Furthermore, the nature of administrative work has changed from hunting down medical charts to interacting with one another through the EHR by sending taskers, and notifying others once the task is complete. Finally, the attitude of all staff, including the medical assistants and laser technicians who were initially resistant, has changed from wondering why an EHR had to be implemented and why the work flow had to change to inquiring about additional functionality of the EHR. The use of the EHR at Northshore Medical Group, LLC is not quite institutionalized, but moving in that direction. To institutionalize the EHR is to fundamentally change the culture [14].

Our next opportunity to fully leverage the EHR is focused on two initiatives: First, to purchase and provide more individual and group training to all internal stakeholders and second, to fully implement patient functionality. To achieve these two goals, Kotter's change management model will again be utilized as the dominant framework to introduce, lead, manage, and evaluate the change.

#### V. LESSONS TO BE LEARNED

The strategic decision to implement an EHR in a small physician practice without full time information technology or informatics staff is challenging, given that the expertise and resources for EHR adoption are often less than what is available in larger organizations with more dedicated resources. Regardless of the size of the organization and the resource base, leaders, managers, and technologists must recognize that this strategic decision involves not only technical decisions, but also social decisions. As such, this strategic decision mandates that the leaders, managers, and technologists view this as a change management initiative. This perspective is likely to increase what is de facto a challenging initiative because of the recognition of the importance of those undergoing a transition in their roles; in the way that they practice, and in the way that they carry out their duties and interact with fellow workers and patients.

#### VI. LIMITATIONS

There exist several limitations which deserve mention. First, this descriptive analysis was conducted in a single group practice in the ambulatory setting. Hence, the findings may not be generalizable to other practice types and settings. Second, this descriptive analysis primarily applied one change management model. As such, any one model is at a disadvantage to fully capturing the adoption of an EHR in any setting but particularly a setting in which there are limited formal information and technology resources. Finally, this descriptive analysis was primarily an observational investigation rather than an empirical investigation and it is important to be aware of experimenter bias in these types of investigations, although exploratory by design.

#### VII. IMPLICATIONS FOR RESEARCHERS

Researchers seeking to further study the implementation and adoption of EHRs in small or large group practices may wish to use Kotter's Change Management model as the theoretical basis to formulate hypotheses or explain descriptive findings. This model is not without limitations, but can serve as a basis for understanding a complex phenomenon, and for eventual isolation of variables that are statistically associated with successful EHR implementation.

Furthermore, future researchers may seek to replicate this investigation in an ambulatory setting or extend this investigation by applying Kotter's Change Management model to other settings ranging from other outpatient settings to inpatient settings. Given the qualitative analysis of this paper, other methodological approaches may be used in future research including survey research.

#### VIII. CONCLUDING REMARKS

We have proposed and demonstrated the use of Kotter's Change Management model to facilitate one of the more challenging aspects of fully implementing EHRs, that is,

physician acceptance and adoption. Based on the lessons learned in the case analysis, our observations may offer information technology and informatics professionals with a theory driven, step-by-step approach to increase the successful implementation and adoption of EHRs in ambulatory settings. If access to care, quality of care, and effectiveness of care delivery are to be fully achieved, then it is essential that EHRs are more fully utilized in all types of settings.

#### REFERENCES

- [1] J. A. Blaya, H. S. Fraser, and B. Holt, "E-health technologies show promise in developing countries," *Health Aff.*, vol. 29(2), pp. 244-251, 2010.
- [2] A. Schutzbank and R. Fernandopulle, "Doubling down: lessons learned from building a new electronic health record as part of primary care practice redesign," *Healthcare*, pp. 14-18, 2014.
- [3] G.J. Annas, "HIPAA regulations-a new era of medical-record privacy?," *New Engl. J Med.*, vol. 348, pp.1486-1490, 2003.
- [4] D. Blumenthal, "Implementation of the federal health information technology initiative," *New Engl. J. Med.*, vol. 365(25), pp. 2426-2431, 2011.
- [5] A.K., Jha, "Meaningful use of electronic health records: the road ahead," *JAMA*, 304(15), pp. 1709-1710, 2010.
- [6] S. L. Decker, E. W. Jamoom, and J. E. Sisk, "Physicians in nonprimary care and small practices and those age 55 and older lag in adopting electronic health record systems," *Health Aff.*, April 2012.
- [7] C. J. Hsiao and E. Hing, "Use and characteristics of electronic health record systems among office-based physician practices: United States, 2001–2012," *Natl. Cent. Health Stat., Data brief 111*, pp. 1-8, [accessed December 18, 2012]. Available at <http://www.cdc.gov/nchs/data/databriefs/db111.pdf>
- [8] E. Hing and C. W. Burt, "Office-based medical practices: methods and estimates from the national ambulatory medical care survey," *Adv. Data*, vol. 12(383), pp.1–15, March 2007.
- [9] A. M. Audet, D. Squires, and M. M. Doty, "Where are we on the diffusion curve? Trends and drivers of primary care physicians' use of health information technology," *Health Serv. Res.*, vol. 49(1pt2), pp. 347-360, 2014.
- [10] I. M. Xierali et al., "The rise of electronic health record adoption among family physicians," *Ann. Fam. Med.*, vol. 11(1), pp. 14-19, 2013.
- [11] K. Keshavjee et al., "Best practices in EHR implementation: a systematic review," *AMIA Annu. Symp. Proc.*, vol. 982, p. 982, 2006.
- [12] P. Varkey and K. Antonio, "Change management for effective quality improvement: a primer," *Am. J. Med. Qual.*, vol. 25(4), pp. 268-273, 2010.
- [13] T. Dimitrovski, P. Ketikidis, L. Lazuras, and P.A. Bath, "Adoption of electronic health records (EHRs): a review of technology acceptance studies," *Proc. Of 16<sup>th</sup> Int. Symp. Health Info. Mgmt. Res.*, pp. 1-9.
- [14] S. Marceglia, L. Mazzola, S. Bonacina, P. Targuini, P. Donzelli, and F. Pinciroli, "A comprehensive e-prescribing model to allow representing, comparing, and analyzing available systems." *Methods Inf Med.*, 52 (3), pp. 199-219.
- [15] N. Borkowski, G. Gumus, and G. J. Deckard, "Modifying physician behavior to improve cost-efficiency in safety-net ambulatory settings," *J. Ambul. Care Manag.*, vol. 36(2), pp. 129-139, 2013.
- [16] D. G. Goldberg, S. S. Mick, A. J. Kuzel, L. B. Feng, and L. E. Love, "Why do some primary care practices engage in practice improvement efforts whereas others do not?," *Health Serv. Res.*, vol. 48(2pt1), pp. 398-416, 2013.
- [17] J. Adler-Milstein, C. E. Green, and D. W. Bates, "A survey analysis suggests that electronic health records will yield revenue gains for some practices and losses for many," *Health Aff.*, vol. 32(3), pp. 562-570, 2013.
- [18] M.E. Morton and S. Wiedenbeck, "EHR acceptance factors in ambulatory care: a survey of physician perceptions," *Perspect Health Inf Manag.*, Vol. 7, pp. 1-17.
- [19] M. Beer and N. Nohria, *Breaking the Code of Change*. Boston, MA: Harvard Business School Press, 2000.
- [20] K. S. Whelan-Berry and K. A. Somerville, "Linking change drivers and the organizational change process: a review and synthesis," *J. Change Manag.*, vol. 10(2), pp. 175-193, 2010.
- [21] S.H. Appelbaum, S. Habashy, J. Malo, and H. Shafiq, "Back to the future: revisiting Kotter's 1996 change model," *J. Manag. Dev.*, vol. 31(8), pp. 764-782, 2012.
- [22] G. B. Svendsen, J. A. K. Johnsen, L. Almås-Sørensen, and J. Vittersø, "Personality and technology acceptance: the influence of personality factors on the core constructs of the Technology Acceptance Model," *Behav. Inform. Tech.*, vol. 32(4), pp. 323-334, 2013.
- [23] A. L. Terry, J. B. Brown, L. B. Denomme, A. Thind, and M. Stewart, "Perspectives on electronic medical record implementation after two years of use in primary health care practice," *J. Am. Board Fam. Pract.*, vol. 25(4), pp. 522-527, 2012.
- [24] J. P. Kotter, *Leading Change*. Boston, MA: Harvard Business School Press, 1996.
- [25] Z. Meidani, F. Sadoughi, M. R. Reza, S. Tofghi, and A. B. Marani, "Organization's quality maturity as a vehicle for EHR success," *J. Med. Syst.*, vol. 36(3), pp. 1229-1334, 2010.
- [26] A. Kouroubali, *Implementation of Health Care Information Systems: Key Factors and the Dynamics of Change*. In PhD Thesis. Cambridge, UK: University of Cambridge, 2003.
- [27] S. M. Tom, C. R. Fox, C. Trepel, and R. A. Poldrack, "The neural basis of loss aversion and decision making under risk," *Sci.*, vol. 315(5811), pp. 515-518, 2007.
- [28] W. Newton and D. Bradley, "Transforming quality of care in North Carolina," *N.C. Med. J.*, VOL. 74(2), pp. 119-125, 2013.
- [29] N. E. Coleman and S. Pon, "Quality: performance improvement, teamwork, information technology and protocols," *Crit. Care Clin.*, vol. 29(2), pp. 129-151, 2013.
- [30] N. M. Lorenzi, A. Kouroubali, D. E. Detmer, and M. Bloomrosen, "How to successfully select and implement electronic health records (EHR) in small ambulatory practice settings," *BMC Med. Informat. Decis. Making*, vol. 9(1), p. 15, 2009.
- [31] K. G. Adler, "How to successfully navigate your EHR implementation," *Fam. Pract. Manag.*, vol. 14(2), pp. 33-39, 2007.
- [32] D. Blumenthal and J. P. Glaser, "Information technology comes to medicine," *New Engl. J. Med.*, vol. 356(24), pp. 2527-2534, 2007.
- [33] R. Ford, W. Heisler, and W. McCreary, "Leading change with the 5-p model: complexing the Swan and Dolphin hotels at Walt Disney World," *Cornell Hosp. Q.*, vol. 49 (2), pp. 191-205, 2008.
- [34] G. Schierhout et al., "Evaluating the effectiveness of a multifaceted, multilevel continuous quality improvement program in primary health care: developing a realist theory of change," *Impl. Sci.*, vol. 8(1), p. 119, 2013.