

GUEST EDITORIAL PREFACE

Innovation and Engagement: The Key to Expedite Health Information Technology Adoption

Bernard Han, Bronson School of Nursing, Western Michigan University, Kalamazoo, MI, USA

Sharie Falan, Bronson School of Nursing, Western Michigan University, Kalamazoo, MI, USA

The necessity for transforming healthcare using information technology was well recognized in the beginning of this century (Institute of Medicine, 2001; Fuchs & Emanuel, 2005). Though no comprehensive healthcare reform was initiated by the U.S. Government, President Obama did sign the *American Recovery and Reinvestment Act* (ARRA) in 2009, of which the HITECH Act (2009) was defined to provide incentives for healthcare organizations and clinical professionals to accelerate the adoption of health information technology (HIT) for better care with lower costs. Since then, many surveys have been conducted about the actual adoption of HIT. A recent report (Ryan *et al.*, 2014) indicates that nearly all surveyed federally qualified health centers (FQHC) (93%) have implemented at least one electronic health information system to track medical records and manage patient care. Seemingly, the adoption rate by FQHC looks great, but it outpaces the adoption rate by office-based physicians. Moreover, the current adoption is primarily focused on the basics of electronic medical records (i.e., internal record tracking and reporting) and very little on the interoperability between different electronic health records (EHR) systems. In fact,

to date most healthcare providers do not give patients direct access to own medical records. As reported by Ryan *et al.*, (2014), there are still many barriers to implementing EHR and the leading one is the “loss of productivity” during the system transition. This experience may partially explain “Why physicians are slow or resistant to the adoption of HIT,” which has been heavily studied by many over the past decade (Ajami & Bagheri-Tadi, 2013; Dünnebeil. *et al.*, 2012; Lin *et al.*, 2012).

In effect, transforming healthcare through using HIT is no easy. As pointed out by Fuchs and Emanuel (2005), “technology alone is never a lasting solution. The way HIT is developed, the way it is implemented and the way it is used are what matter.” In addition, widespread adoption of HIT applications requires behavioral adaptations on the part of large numbers of clinicians, organizations, and patients (Institute of Medicine, 2001). Apparently, the success of transforming healthcare using HIT hinges on a joint buy-in from multiple stakeholders, who are either directly or indirectly involved with or affected by the EHR and its services. Time elapsed! More than a decade has passed since “Using Information Technology” was identified

as one of the first steps taken to cross the quality chasm of healthcare (Institute of Medicine, 2001). Why was it so slow for clinicians or EHR users to adopt HIT? Could we eliminate barriers or develop resolutions to expedite HIT adoption? These questions lingered and became the cause for us to define a theme for the biennial *International Conference on Health Information Technology Advancement*, which was held at Western Michigan University, Kalamazoo, Michigan on October 17-18, 2013 (ICHITA-2013).

Through an extensive literature search, both barriers and incentives to the adoption of HIT were identified. Research findings show a few leading barriers for physicians are: *perceived inequality* (toward workload), *perceived threats* (toward job security), *improper design* (toward usefulness), and *loss of productivity* (toward extra learning) (Ajami & Bagheri-Tadi, 2013; Dünnebeil, *et al.*, 2012; Lin *et al.*, 2012). While these barriers are found true among physicians, they may also be applicable to other EHR users (e.g., nurses, administrators, lab technicians, etc.). Fortunately, more literature search reveals that engaging physicians and/or patients during the system transition plays a determinant role in HIT adoption (Chu & O'Brien, 2013; Cohn, *et al.*, 2009; Gephart & Effken, 2013; Gill, 2013). These findings are supported by a recent report (Paget, *et al.*, 2014), which points out "innovative uses of HIT" will increase EHR users' engagement. Interestingly, a very similar conclusion was made in an earlier study (Cohn, *et al.*, 2009), which concluded that "... organizations that welcome innovation can reap gains in quality, safety, and coordination of care." Therefore, the theme of ICHITA-2013 was defined -- *Expediting Health Information Technology through Innovation and Engagement*. This theme captured significant attention from academics. Limited by the presentation openings, and one round of blind reviews (with two reviewers per submission), twenty-two papers were accepted. Compared to the first ICHITA (2011), the paper quality of 2013 is far better, with submissions from three countries and eight states in USA.

With the approval from the editor of *International Journal of Healthcare Information Systems and Informatics* (IJHISI, the top nine of all accepted papers (40%) were sent to three members on the IJHISI editorial board for a second round of blind reviews. As a result, the top four highest quality papers were selected for publication as a special issue of IJHISI. These top ranked papers represent an acceptance rate lower than 20% of the first-round accepted papers. Each of them has a fine research method with meaningful results that may accelerate the adoption of HIT. A brief highlight on each paper's contributions follows.

The first paper, by Ryan, Doster, Daily, and Lewis, investigates a balanced approach that integrates information systems with business analytics to improving the efficiency and effectiveness of Perioperative Process Management across patient quality of care, stakeholder satisfaction, clinical operations, and financial cost containment. Their study uses 120-months data from an academic medical center. Their approach provides a holistic framework that not only empowers healthcare professionals but also integrates Information Systems (IS) with business analytics to support monitoring, assessment, and control of the preoperative process via a multi-level balanced scorecards architecture. This study sheds light in management innovation using an emerging information technology and offers an end-to-end view for healthcare stakeholders to have a clear understanding of the preoperative process with measures for better management and performance to meet the defined goals.

The second paper, authored by Pendergrass, Heart, Ranganathan, and Venkatakrishnan, studies one of the paramount issues in health care—the information security for telemedicine. Their research has direct impacts on new and advanced applications that are developed for telemedicine in terms of understanding potential security threats that are to be eliminated to ensure the privacy of patient information. In specific, this study employs a table-based approach to assess security threats that pertain to telemedicine applications. The proposed modeling

framework using a table-based method provides practitioners an intuitive and simple approach to prioritizing vulnerabilities, their threats and potential remedies. In essence, this research is considered an innovative use of information security technology with simplicity and flexibility to monitor threats that may endanger the privacy of patient health information in order to meet the regulations imposed by HIPAA and the HITECH Act.

In contrast to the first two papers with a focus on innovative use of information technology, the third paper, by Lavariega, Córdova, Gómez, and Avila, focuses on the application of mobile devices and wireless sensors to collect relevant data from pregnant women in support of maternity-infant care. Their research is to minimize avoidable maternity infant deaths that are alarming high in rural areas in Mexico due to poor monitoring of pregnancy and lack of medical resources for necessary maternity care. The application of electronic mobile devices engaged pregnant women to receive alerting messages during maternity period that subsequently reduced unborn infant deaths and minimized resources used for multiple causes related to maternity care (e.g., hypertension, hemorrhages, and other childbirth complications). This study has already produced noticeable differences in rural maternity care and is expected to be expanded by engaging social workers through the use of tablets during the assessment process.

Along the same line of user engagement, the last paper, authored by Alaiad, Zhou, and Koru, explores the adoption of robots for home healthcare. Through engaging patients with better self and home care, their research goal is aimed at reducing readmission to hospitals to conserve and reduce the consumption of critical and scarce resources. This study is considered meaningful because home healthcare becomes an effective way to minimize the skyrocketing costs by engaging patients to use emerging technology to accentuate and build their skills in self-management. In their research, Alaiad

et al., applied and extended the UTAUT model to test data collected by a questionnaire. Empirical results confirmed that *performance expectancy*, *social influence*, and *perceived security* are directly associated with patients' intention of adopting robots. Nevertheless, *effort expectancy* does not have a direct effect on the *usage intention*.

While innovation and engagement have been identified as key to promote the adoption of HIT, more innovative uses of information technology are expected to engage EHR users that range from clinical professionals (e.g., physicians, nurses) to patients (e.g., inpatients, outpatients) to general consumers. Though "disruptive innovations" are proposed by Christensen *et al.*, (2000) as a possible approach to curing health care, it may not happen due to the multi-facet nature and multi-stakeholder involvement of healthcare. However, multiple efforts have been dedicated to innovate healthcare services, which include knowledge-based innovations to build service providers' intellectual capacity (Lerro, 2012), service innovations to enhance health information access and eliminate disparities among healthcare consumers (Zuckerman *et al.*, 2013), user-driven innovations through an Information and Communication Technology (ICT) based infrastructure (Andersen & Jansen, 2011), and practice innovations to motivate general practitioners to work together using information technology (Jiwa 2013), just to name a few.

To conclude this special theme issue, a book review of a recent publication entitled "Accelerating Health Care Transformation with Lean and Innovation" is included. As summarized by Falan, this book presents a successful story about a leading hospital in the United States that describes the integration of *lean* and *innovation* to pursue the perfect patient experience while maximizing the organizational performance and healthcare quality. In short, innovation is a never-end journey. The *lean* concept employed by the *Toyota Production System*, seemingly contradictory to *innovation*, could be success-

fully incorporated into healthcare organizations for quality healthcare with efficiency. It is a “must read” for anyone in healthcare who is interested in improvement and innovation.

Indeed, innovation and engagement are the key to expediting HIT adoption, the former ensures new ways to meet the users’ needs and the latter involves users in the process of developing or implementing HIT solutions. Both are critical to the success of transforming healthcare using information technology. We are still at the beginning stage of the journey. More strategic actions are awaiting to be taken to build a solid roadmap to success in healthcare reform.

Bernard Han
Sharie Falan
Guest Editors
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Bernard Han is an HIT Pro, the Founding Director of the Center for Healthcare Information Technology Advancement at Western Michigan University (WMU) and Professor and Co-Director of the Health Informatics and Information Management Program at WMU. Dr. Han was chair of the Department of Business Information Systems (2003 – 2009), Haworth College of Business at WMU. Dr. Han received his tenure at Washington State University (Pullman, Washington) in 1995, his Ph.D. in Information Systems from University of Washington (Seattle, Washington) in 1989. Dr. Han served on the editorial board for two academic journals - International Journal of Operations and Quantitative Management and Journal of Information Technology and Management and is currently on the Editorial Review Board for Decision Sciences Journal of Innovation Education. Dr. Han's recent research focuses on business process management using enterprise-wide systems, teaching innovations using collaborative tools, and health care management using information technology. Dr. Han has published research papers in journals such as IEEE Transactions on Robotics and Automation, European Journal of Operational Research, Annals of Operations Research, Journal of Telecommunication Systems, Communications of the ACM, European Journal of Information Systems, Decision Science Journal of Innovative Education, International Journal of Nursing Terminologies and Classifications, International Journal of Nursing Knowledge, International Journal of Electronic Healthcare, and International Journal of Healthcare Information Systems and Informatics, and among others.

Sharie Falan is Associate Professor of Nursing at Western Michigan University, Co-Director of the Center for Health Information Technology Advancement, and the Health Informatics and Information Management curriculum. Prior to joining WMU, Dr. Falan received her PhD in Nursing from University of Michigan (Ann Arbor, Michigan) in 2007, MSN degree from University of Michigan in 2004, and BSN degree from Western Michigan University in 2000. Dr. Falan is board certified in Nursing Informatics and holds the Health Information Management and Systems (HIMSS) credential Certified Professional in Healthcare Information and Management Systems (CPHIMS). Dr. Falan has worked in acute care and home care nursing with a focus on implementation of clinical information systems. Dr. Falan is a contributing member of the Technology Informatics Guiding Educational Reform (TIGER) initiative and member of NANDA-I Informatics Committee. Her work on the Usability and Clinical Applications Design Collaborative Team identified key recommendations for Health Information Technology vendors to develop better clinical applications for health care practitioners. Dr. Falan has presented her research work in both national and international conferences. Her most recent research focuses on similarity, concept analysis, nursing terminologies standardization, informatics competencies, and health care management. Dr. Falan's research has appeared in the Journal of Nursing Measurement, Communications of the ICISA: an International Journal, International Journal of Nursing Terminologies and Classifications, the International Journal of Nursing Knowledge, the International Journal of Electronic Healthcare, and the International Journal of Healthcare Information Systems and Informatics.