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Healthcare Delivery Reform and New Technologies

Organizational Initiatives



MATTHEW GUAH

Healthcare Delivery Reform and New Technologies: Organizational Initiatives

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* * *

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Preface

A book that combines healthcare and information and communication technology (ICT) usually turns out to be like viewing an old subject from a slightly different angle. The good thing about that is one or two new ideas often emerge and old ideas are seen in a new light. Most of the new ideas in this book and the new approach to old ideas are outlined in the Preface. The rest of the book might seem nonsensical at times if the Preface is not thoroughly read. From chapter 1 through Chapter 20, the reader is given different healthcare delivery reform initiatives, evidenced by all these contributions from around the globe.

HEALTHCARE REFORM MODELS

Although healthcare reform models came into existence in the early 1940s, their use did not become widespread until the middle of 1970s. The advent of computer-based healthcare reform models was in direct response to a series of very serious problems encountered by healthcare organizations, throughout the world, in the late 1990s—including increasing cost of maintaining an aging population by most western countries, double-digit inflation in various countries, increasing insurance bills, and increased government regulation (Teperi et al, 2009). These problems have placed enormous pressure on the administrators of healthcare organizations—and governments alike (Clegg & Shepherd, 2007). As it became increasingly apparent that manual reform strategies were not adequate to meet the increasing healthcare demands for future generation, ICT was considered for its extremely powerful tools, enabling healthcare administrators to cope more effectively with the many uncertainties (Wilson & Lankton, 2004).

After attending the AAA (American Accounting Association) annual meeting and AMCIS (American Conference on IS), I had the privilege of spending three weeks in the US—mainly visiting friends and family members—in Texas, PA, NJ and NY. Like most visitors to the US in the month of August 2009, I was fascinated by the healthcare reform debate as President Obama and his team tried to push through the ‘Healthcare Reform Bill’. While this book is not particularly dedicated to the happenings around healthcare reform in the US, it is worth mentioning my observation here. Despite many waves of debate and piecemeal reforms, including millions spent on technology infrastructure, the U.S. health care system remains largely the same as it was decades ago. Critiques claim there is no convincing approach to changing the unsustainable trajectory of the system, much less to offsetting the rising costs of an aging population and new medical advances (Brennan, 2007; Scott et al, 2000). The Americans situation might have been significantly highlighted as the result of President Obama making healthcare his *number 1* agenda item. Nearly all countries in the developed world confront a similar challenge—finding the right way to create a well-resourced but sustainable system that provides healthcare and

services of the highest quality for all. Notwithstanding the clear political differences, it is impossible to find credible opponents to the goal of providing ‘universal health care’ (Darzi, 2009). Every country is actively seeking a formula that suits it best in achieving this monumental goal.

The outcome of health care reform in Italy or Germany will no doubt be very different from those of USA or UK (Shaw et al, 2009). The NHS (national health service in UK) lies at the opposite end of the spectrum from the current U.S. system, in terms of both its structure (a tax-funded public program as opposed to mainly private, employment-based insurance) and the problems it faces (historically, a lack of resources and slow uptake of new treatments as opposed to bulging costs). In the late 1990s the UK had to confront reform on a scale as challenging as that being contemplated in the USA today (Solberg et al, 2007; Wanless, 2002).

In 1997, Britain had a new government, which then inherited a health care system that was chronically underfunded and suffering from a lack of capacity, with average waiting times of 18 months from referral to treatment. Funding for 1997 was £35 billion which has risen to £110 billion for 2010 (NAO, 2006). The result is waiting times are now as short as they’ve ever been — 10 years ago, patients waited approximately 18 months for treatment, and now they wait only a few weeks. Although both the causes of and responses to reform were very different from those on the opposite side of the Atlantic today, the NHS’s experience can provide some valuable lessons to both Canada and the United States.

A key finding from my own research on the NHS is that it is important for physicians to be involved in both informing and leading change (Currie & Guah, 2007; Guah, 2008; Guah & Fink, 2008). Successive attempts at top-down regulation and reform in the UK damaged physicians’ morale and bred distrust between physicians and all healthcare administrators—specifically politicians. Not having been central to the decision making, physicians subsequently didn’t trust the proposals or fully understand the purpose of healthcare reform initiatives. On the contrary, who could disagree that if a physician understood what drives healthcare cost, he/she would have the *potential* to reduce those costs? One can assume that governments throughout the world have figured that out when it comes to paying for health care. Assuming therefore that President Obama’s government wants to reduce costs, they would pay the providers less and take appropriate measures so all the other issues will go away. Applying a combination of reform initiatives to USA healthcare sector means this government would need have to address the below 5 issues--primarily:

- Technology for the Healthcare sector are double the costs other countries
- The emergency room usage has reached it’s highest level
- 30% of medicare costs are for the last year of life
- 5% of the medicaid population uses up 50% of the resources
- admissions have gone up nationally 5% a year

ICT IN HEALTHCARE

Most members of the public find it refreshing to see politically naive, formerly unengaged Americans show up at town hall meetings (in the month of August 2009), asking questions and expressing personal opinions about a major government initiative. I was told this move to reform healthcare delivery process has motivated many—that would normally be at home watching television programme reruns—to participate in the political process. On several occasions, every major television channel was screening

concerned citizens demonstrating their democratic rights by asking elected officials—including President Barack Obama—tough questions and weighing in on what was missing from healthcare system. I couldn't stop myself thinking such feelings and desires far surpass what their 535 congressional representatives unilaterally decided was best for these citizens. Scientific mindset quickly noted that significant propaganda was also being spewed by many who appeared to have an agenda with certain degree of bias.

Notwithstanding, USA—along with most western countries—is experiencing an increasing aging population and a growing number of chronically ill people. This situation requires the national health-care system that is not only prepared for higher future demands, but also equipped to face issues that could collapse an entire workforce (Constantinides & Barrett, 2006; Porter et al, 2009). The shift to a more consumer driven healthcare market is also impacting consumer expectations with regards to the quality and consistency of the care patients seeks (Badgett & Mulrow, 2005; Berwick, 2003; Davis, 2004). Moreover, patients facing a potentially life threatening disease are seeking the rapid responses from healthcare systems and operators and, including, better plans for treatments (Donaldson, 2008). On the other hand, the wide diffusion of wireless technologies along with the emerging of new devices and sensors are opening a new market of better and cheaper healthcare applications.

Within the last decade, we have seen Europe, Australia and now America show a new openness to changing healthcare systems that a number of people agree is broken. What is needed now is a clear strategy, by healthcare providers, that sets forth a comprehensive vision for the kind of health care system they want to achieve and a path for getting there. The central focus must be on increasing value for patients by efficiently achieving good outcomes, not merely *savings* money (Porter & Teisberg, 2006). Cost can truly be contained in health care by improving outcomes in a value-based system because achieving and maintaining good health is inherently less costly than dealing with poor health (Remler & Glied, 2006).

WHO SHOULD BENEFIT FROM THIS BOOK

Mr. William Beveridge, the founder of the NHS in 1942, has repeatedly been quoted as saying “a revolutionary moment in the world's history is a time for revolutions, not for patching”. I'll interpret that in today's situation where the combination a global downturn sees us sitting on the time bomb of healthcare costs. There is no denying that healthcare in nearly all Western continents (including Canada, USA, Western Europe, and Australia) have reached such a moment. The publication of this book signifies that the matter is too important to be left to the politicians and policymakers. Our goal is to encourage—and even make it an urgent requirement—for all physicians to step up and lead the debate on healthcare reform initiatives.

This book includes original research articles, case studies from four different countries, all on the path of reforming their national healthcare delivery. It is concerned with the theory and practice of healthcare reform initiatives from around the globe. It attempts to outline a systematic approach to the policies, strategies and implementation of various healthcare reform initiatives as researched by our remarkable list of academic and industry researchers in the field.

I have a great pleasure in seeing this first in a series of books on international healthcare delivery reform initiatives published. I believe this book represents an important, but under-researched, topic. With new initiatives being declared every few months in this critical sector, keeping track on reforming healthcare delivery is an essential part of our tasks as academic researchers. I hope the fine contributions in this book will encourage the publication of more research in the area of healthcare reform. I appreci-

ate the efforts of all my contributors and all reviewers for the International Journal Healthcare Delivery Reform Initiatives making this book a reality.

All these case studies in this issue provide brief literature reviews before presenting and interpreting their own research datasets. It is therefore our hope that this book, including 20 research articles, from 12 different countries (in Asia, Africa, Europe, America and Australia) all on the path of reforming their national healthcare delivery processes, would contribute to our understanding what reforming healthcare delivery process truly involves. I also hope this book will provide healthcare professionals, and academic researchers, with valuable information that is useful in the continuous search for successful reform to our healthcare delivery.

SPECIFIC HEALTHCARE REFORM INITIATIVES FROM AROUND THE WORLD

This section briefly describes each of the twenty-one cases presented in this book to examine the complex issue from different parts of the globe—including Africa, America, Asia and Europe—each give it different perspectives. In Chapter 1 Tommaso Federici and Andrea Resca offer insights related to the introduction of emerging technologies in a traditional sector. Their paper examines how the effectiveness of such initiative is influenced by factors such as large expenditures for a comprehensive design due to the need for different tools, the long-lasting experimentations and multiple solutions. Focusing on the dyadic level, the paper employs Lim's (2000) knowledge management approach to arrive at analytical results regarding the influence of incompleteness and asymmetry in the information sets involved in appropriately valuing e-procurement in an Italian local healthcare agency.

Chapter 2 is a contribution from Maricarmen Planas-Silva and Rhoda Joseph suggesting clinical trials to be a critical component of the advancement of medicine. It demonstrates an on-going reform initiative in the United States of America to prove that evidence based medical practices require the use of clinical trials to evaluate new treatments, devices, drugs and modalities for the prevention and treatment of diseases. As its subject the paper examines the use of and adoption of IT in clinical trials, especially within cancer treatment. It concludes by acknowledging that IT is not a panacea to clinical trials in the USA today mainly due to challenges in the areas of system interoperability and data security.

Chapter 3, by Adebusoye Anifalaje, takes the reader through the intricacies of primary healthcare delivery in Nigeria. The study examines the complex interaction of individual and contextual factors such as lack of value for process and knowledge depreciation in delivering healthcare provision benefits. After diagnosing the existing tension between local and central government agents and consequential impact on primary care delivery—in the context of developing countries—the paper argues the need for effective regulatory and enforcement framework.

Based on a decision space theory, the research findings include limitation in the actual roles of information within Nigeria's primary healthcare system, thus sabotaging the principles of a 'rational' public healthcare system. The study suggests implications for the complex decision making process in developing countries with regard to healthcare knowledge creation and opens up avenues for future research to validate the assumptions and results.

Chapter 4 is contributed by Raj Gururajan and uses both qualitative and quantitative data to derive outcomes of clinical usefulness as a driver of wireless technology for Indian healthcare.

The outcomes established that in addition to technology factor, clinical, administrative, and communication factors quite often play crucial role in determining the uptake of wireless technology for

healthcare sector. Upon using PSL model to analyze a large set of data, the paper confirms that simply acquiring wireless technology would be insufficient to accomplish clinical usefulness and subsequently drive adoption and diffusion. It promotes the need to integrate wireless systems with process improvement and organizational change within Indian health service providers.

In Chapter 5, Blessing M. Maumbe, Meke Shivute and Vesper Owei examine the use of ICT in health service provision in Namibia in an attempt to contribute to the understanding of patterns to ICT use by both public and private health service providers and their patients. The study collects data from patients in the Khomas and Oshana regions in Namibia. IT identifies three main factor groupings (namely high technology, mobile technology and traditional technology). The paper provides insights for practice and for further research in signaling and incentives for a changing role of functional literacy and policy implications to healthcare delivery in Namibia.

Chapter 6, submitted by Gary Hackbarth and John McQuade, evaluated 31 Indoor Air Quality (IAQ) checklists using CATPAC for information completeness. They found that these sources differed in both the depth and breathe of information provided. The authors conclude that users of healthcare information may be underserved and that healthcare information providers might act in a more collaborative way to better balance the presentation of their information in terms of depth and breathe of presented content.

Chapter 7, by Robert Breas and Matthew Guah, is study on the need for readiness framework when implementing IS in healthcare institutions. They found that most systems in hospitals today concentrate on relatively simple coordination, resource allocation and documentation aspects of healthcare operations. Yet in practice, the adoption of new systems is still difficult and generally considered a very slow process. After interviewing large groups of healthcare actors, within a large teaching hospital in The Netherlands, they also identified a set of key bottlenecks in the IT adoption process. Their conclusions suggest that health care organizations should be better prepared in order to facilitate easier IT systems' adoption. They discuss the implications of these findings on our understanding of such things as clinical pathways, workflow management, and optimization of resource utilisation, clinical decision-making, staff training and quality improvement in healthcare delivery. They also propose a readiness framework as a prelude implementing new systems in this critical environment.

In Chapter 8, David Meinert and Dane Peterson, present their study that examined potential characteristics of physicians considered helpful in the identification of individuals that are most likely to pose a threat to the successful implementation of an EMR system in a multi-specialty clinic. The authors have provided a commentary, focusing on explanations of the results which demonstrated that older physicians and physicians with only minimal computer skills are more likely to have negative attitudes regarding EMR technology. The paper acknowledges that Medical specialists were most likely to have positive attitudes with respects to the use of EMR systems, while primary care physicians were most likely to have doubts regarding the purported benefits of EMR technology.

Chapter 9 is by Esko Alasaarela, Ravi Nemana, Steven DeMello, Nick S. Oliver and Masako Miyazaki, who present analysis of data from their international collaborative study that focused on the future of healthcare needs, technology requirements and solutions for effective use of wireless platform for health care delivery. The results help to clarify views on the incorporation of wireless platform for future health care delivery and personal health management. The paper contains key findings involving quality improvements and process enhancements as well as integration of personal health monitoring and suggestions that health promotion and illness prevention growth as a result of using mobile solutions. Like the Dutch study, this paper also proposes a framework that can be used in developing wireless health care solutions for managing diseases and related health problems.

Chapter 10 was submitted by Alalwany Hamid and Alshawi Sarmad, appraising the increasingly evolving research area of E-health. The authors list a number of characteristics necessary for the appropriate evaluation of E-health services and propose a criteria-based evaluation framework maximizing the full potential of ICT in healthcare delivery. They conclude that E-health evaluation framework improves our understanding of IS roles in healthcare and contributes to high quality healthcare services.

Chapter 11, by Ray Gururajan, Tiana Gurney and Abdul Hafeez-Baig, presents a study on wireless technology in Indian Healthcare. This qualitative research involving 200 completed surveys, contributes three major determinants for successful wireless technology in healthcare delivery: barriers, drivers and clinical inferences, along with several sub-components for each.

Nesaar Banderker and Jean-Paul Van Belle contribute chapter 12 with demonstration of how mobile technology is helping to improve the quality of healthcare delivery in South Africa despite the presence of resource constraints prevalent in all developing countries. Using qualitative research with thematic analysis the authors confirm a number of key adoption factors identified in prior research (namely job relevance, usefulness, perceived user resources and device characteristics) along with additional adoption factors (namely patient influence, support structures from national government and hospital administration, and unease in respect of malpractice legal suits). Chapter 13 is another USA contribution by Thomas Miller, Robert Morgan and Jennifer Wood. They review the use of tele-practice applications in rural community for clinical and educational purposes and propose a video teleconferencing model of healthcare for certain under-privileged populations. The paper also explains how professional consultation within teams may benefit rural educational systems. The authors outline mechanisms (processes) for successfully implementing their proposed model—Tele-health Intervention Project—for implementing a dimension of the public education campaign to reach underserved target groups in need of health and prevention education information across USA. They conclude that this model demonstrates the capability of reducing time and distance barriers in the provision of healthcare and education through tele-practice technology.

In Chapter 14 Torben Larsen explains how Integrated Homecare is combining efficacy with net savings to represent a prototype of integrated care with overlapping services for better clinical continuity in Denmark. The author includes frequent chronic conditions—such as stroke, heart failure, chronic obstructive pulmonary disease and mental disease—and exhibits parallel results to explain a common neuro-economic framework. Using a SWOT analysis of integrated homecare the paper emphasizes how various characteristics of integrated homecare can result to low-tech patient benefits, affordable by low and middle income countries, and low levels of trust across professions and settings. The paper also explains these two strategies recommended by European Union states:

Make a synthesis of existing and ongoing research as a health technology assessment (HTA) of IHC for multidisciplinary teamwork across the hospital and primary care interface; and Focus on dissemination by the formation of country specific multidisciplinary networks on IHC.

In Chapter 15 Esteban Pino, Dorothy Curtis, Thomas Stair and Lucila Ohno-Machado realized SMART, a pervasive health monitoring system for mass casualty emergencies and general ad hoc patient monitoring sites. The system prototype has been deployed in a hospital and evaluated over a period of eighteen months. As another remarkable result, authors demonstrated that the construction of real, effective and worthy pervasive systems can no longer be done without the cooperation of a multi-disciplinary team composed by computer science researchers and physicians that must work together.

Nilmini Wickramasinghe, Indrit Troshani, and Steve Goldberg, in Chapter 16 have focused their research on people suffering from diabetes, which is becoming one of the most serious threats for oc-

cidental life-style people. Authors have presented a solution that aims at facilitating the work of several healthcare stakeholders including government, healthcare providers that are looking for improved and measurable outcomes among diabetes patients. Specific benefits range from decreasing diabetes related complications to reducing the economic burden on the health system.

Leroy Chan, Branko Celler, James Zhang, and Nigel Lovell contributed Chapter 17 with focus on Wireless Sensor Networks design for ubiquitous wellness monitoring in residential aged care facilities. Authors have included brief descriptions on sensor design, wireless communication protocols and network topologies. They also have examined various data processing methods and knowledge management tools to support the collection of sensor data and their subsequent analysis for health assessment.

Shuyan Xie, Yang Xiao, and Hsiao-Hwa Chen have reported in Chapter 18 the current and future views of nursing home with specific interest for the United States. They have also examined the life of elder in a real nursing home, the Thomasville Nursing Home, in terms of the level of condition and management, residents' satisfactions and demands, government regulation and influence. They have also shown the ability of e-health technology to improve the quality of service in a nursing home to meet residents' needs.

In Chapter 19 Antonio Coronato, Luigi Gallo and Giuseppe De Pietro, have presented a pervasive infrastructure of services for smart medical environments. Such an infrastructure has been adopted to implement pervasive, seamless and context-aware access to medical data. The specific application has been focused on providing medical staff with high volume rendered data, which is a computing intense task and requires many computing resources. The approach proposed relies on a service e that is able to exploit even mobile computing resources to accomplish such a task in a transparent way for users.

The final contribution comes from Tristan Allard, Nicolas Anciaux, Luc Bouganim, Philippe Pucheral, and Romuald Thion, in Chapter 20, that concerns the realization of Electronic Health Records (HER) that must assure a high level of dependability and, particularly, of privacy. The proposed solution is based on the adoption of new hardware portable device, associating the security of a smart card to the storage capacity of a USB key, to give the control back to the patient over his medical history. The target is to complement a traditional EHR server with such a device in order to protect and share highly sensitive data among trusted parties and to provide a seamless access to the data even in disconnected mode.

FUTURE OF HEALTHCARE REFORM

We continue to be challenged by the need to find very efficient ways to reform healthcare delivery process that is both acceptable to the public and sustainable into the future? The above contributions have listed a number of efforts being undertaken. However, there still needs to be honest and reasonable organizing principles and realistic policy changes that could be adopted as part of a comprehensive reform initiative. Such initiatives should take into consideration that there are limited resources available to address pressing social problems, especially as we find healthcare providers more tightly squeezed—financially—in the current economic climate (Brown, 2001; Varkey et al, 2008). While healthcare delivery reform might not be possible without broadly expanding public programs or giving subsidies to healthcare providers, we must be careful not to exceed our ability to cover the additional cost.

A major reason for the growing number of people worldwide experiencing the lack of access to good healthcare facilities is the rising cost of healthcare. It should be considered mandatory for all healthcare plans—anywhere in the world—to contain an option that offers better value for all. Various mechanisms

should also be available to help healthcare providers increase their actions to promote more effective competition among themselves.

The Internet age has helped our recognition that information is also a significant key to more informed decision-making in the healthcare (Devaraj & Kohli, 2000). When patients—and their carers—are faced with a choice of possible healthcare solutions, they need information that facilitates comparison. Governments from around the world should ensure the public has access to information on healthcare plans—along with choices that permit such comparisons without imposing excessive restrictions on what options may be offered to patients. This not only alleviates the greater challenge in developing reliable and accessible information about treatment alternatives, but also levels the quality of care different providers' offer to patients. Every patient involved in the healthcare process, generates enormous information—usually over a specified period—about healthcare and services, but much of that information is filed away and inaccessible.

The many cases above demonstrate that more health care does not necessarily mean that people will be healthier or live longer. An individual's state of health depends on many factors--genetic, lifestyle, occupational, environmental (Goossens et al, 2008). While greater access to healthcare information can help significantly, it is evidence show that policies and regulations (i.e. laws and regulations regarding compulsory seat belts and smoking bans in certain places) have done more to improve health in the society and longevity in particular nations than increasing the budgets for specific clinical services. Information systems that contribute to health promotion, for the purpose of avoiding disease outbreak, can also result into more return-on-investments—in terms of reducing the need for health spending—than policies to expand cost of treatment.

Privacy concerns, on the other hand, must be addressed and decisions must be made about who should have access to patient data and how such data can contribute to improved knowledge of both the effectiveness of alternative treatments and the performance evaluation of healthcare providers.

IMPLICATIONS & CONTRIBUTIONS

The preceding chapters recommend more studies of healthcare reform initiatives problems at a global context and through the integration of social, technical, and political perspectives. Overall, I am happy to have initiated a truly international journal making available the opportunity to bring together scholars adopting a variety of perspectives to examine the role of IT-led reform initiatives in the healthcare sector. This initial volume of a series containing various healthcare delivery reform initiatives research work makes a substantial contribution in enhancing our understanding of the complex challenges involved in reforming healthcare delivery. These chapters also open up a variety of avenues for research into healthcare reform initiatives and the role of information systems in improving the quality of healthcare delivery that I hope will spur further work in the general area of *Healthcare Information Management* as an important specialist area of academic study in business schools.

Nearly all chapters provide brief literature reviews before presenting and interpreting qualitative and/or quantitative research datasets. It is my hope that all of the papers in this volume provide healthcare professionals, and academic researchers, with valuable information that is useful in the continuous search for successful reform to our healthcare delivery processes.

Comprehensive reform will require simultaneous progress in all these areas because they are mutually reinforcing. For example, outcome measurement not only will improve insurance-market competition but

also will drive the restructuring of care delivery. Delivery restructuring will be accelerated by bundled reimbursement. Electronic medical records will facilitate both delivery restructuring and outcome measurement. Moving ahead now on all these fronts is also important in order to align every stakeholder's interest with value, or reform will once again fail. However, a health care strategy, like any good strategy, involves a sequence of steps over time rather than an attempt to change everything at once. Road maps will be needed for rolling out changes in each area while giving the actors time to adjust.

Some new organizations (or combinations of existing ones) will be needed: a new independent body to oversee outcome measurement and reporting, a single entity to review and set healthcare reform standards, and possibly a third body to establish rules for bundled reimbursement. President Barack Obama has brought health care reform to the forefront of people's minds, not only in the US but also around the world. Repeatedly quoted statistics — on the numbers of uninsured Americans, for example, or the high, rapidly growing expenditures on health care — leave no room for ambiguity, and groups across the global political landscape in recognizing that health care systems are unsustainable in current forms. Quietly, we can safely assume that politicians and healthcare administrators—from around the world—are strategizing about healthcare reform in their respective domains.

The big question is whether any healthcare authority (be it American, British, Canadian, French, German, etc) is capable of moving beyond a reactive and piecemeal approach to a truly national health care strategy centered on value (Porter & Teisberg, 2006). This undertaking is complex, but the only real solution is to align everyone in the systemic thinking around a common goal: doing what's right for patients supported by the right type of IT, as discussed in this book.

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