# Preface

Healthcare in the 21st Century is facing three very large forces of change; namely, an informed and empowered consumer, the need for e-health adaptability and a shift from focusing on primarily curing diseases to the prevention of diseases. In addition to having to contend with these forces, the cost of delivering quality healthcare is increasing exponentially. While no country spends more per capita than the U.S., most of the 29 countries of the Organization for Economic Cooperation and Development (OECD) have doubled their healthcare expenditures over the last 20 years. Hence, reducing this expenditure as well as offering effective and efficient quality healthcare treatment is becoming a priority globally. New business and technological advances have the potential not only to reduce these costs but also, and equally importantly, to make it possible to achieve high quality, high value and high accessibility to healthcare delivery systems. Thus, the adoption of such advances, specifically knowledge management strategies, processes, techniques and tools into the healthcare industry may not be a panacea for addressing all of today's current healthcare challenges but is certainly an important component for any solution.

The purpose of this book then, is to increase the awareness of the need for embracing knowledge management strategies, processes, techniques and tools throughout various areas of the healthcare sector as well as highlight the benefits such initiatives will provide. The book is divided into four sections described here.

## BOOK LAYOUT

Section I, *Knowledge Management in the Healthcare Industry*, includes four chapters.

Chapter I (Sharma, Wickramasinghe and Gupta), *Knowledge Management in Healthcare*, describes the basics of knowledge management and how knowledge management concepts can be applied to the healthcare sector. The authors in their chapter also suggest various approaches that could be used for implementing knowledge management in healthcare organizations.

Chapter II (Desouza), *Knowledge Management in Hospitals*, describes the significance of knowledge management in healthcare organizations. The chapter describes how to develop and foster a knowledge management process model in healthcare organizations. The author also identifies the key barriers for healthcare organizations to cross in order to fully manage knowledge.

Chapter III (Wahle and Groothuis), *How to Handle Knowledge Management in Healthcare: A Description of a Model to Deal with the Current and Ideal Situation*, cites many reasons such as: the introduction of Diagnosis Treatment Combinations (DTCs) in The Netherlands, which makes the learning capacity and competitiveness of the hospital an important factor; the demand for efficiency and effectiveness due to shortages in the job market; the requirement of patients for better quality care and related provision of information, and, the fact that hospitals and/or any other Healthcare Organization (HCO) are becoming more knowledge intensive as principle reasons why healthcare organizations are developing and embracing knowledge management strategies, process techniques and/or tools.

The final chapter in this section, Chapter IV (Rubenstein and Geisler), *How to Start or Improve a KM System in a Hospital or Healthcare Organization*, is based on years of experience in the field and the basic steps required to offer KM solutions in healthcare organizations. The chapter discusses what hospitals and other healthcare organizations need to have in place in order to be successful including, but not limited to, bricks and mortar, human resources, medical technology, financial systems, and other infrastructure items.

Section II, *Approaches, Frameworks and Tools to Create Knowledge-Based Healthcare Organizations*, has nine chapters.

Chapter V (Gargeya and Sorrell) is titled *Moving Toward an e-Hospital*. The authors argue that while some aspects of patient care must continue to be delivered locally, Internet technologies and "e-healthcare experiences" are likely to play an increasing role in the pre-delivery and post-delivery arenas. Their chapter presents an overview of infrastructure issues and technologies that will enable hospitals to "plug into" the evolving e-health continuum.

Chapter VI (Puerzer), *Applying Automatic Data Collection Tools for Real-Time Patient Management*, discusses how hospitals can effectively deal with many of the problems associated with scheduling and overcrowding, and improve the quality of care through the use of automated patient management system. The author argues that knowledge management systems can only be effective if accurate and comprehensive data is accessible to the knowledge management systems.

Chapter VII (Testik, Runger, Kirkman-Liff and Smith), *Data Mining and Knowledge Discovery in Healthcare Organizations: A Decision-Tree Approach*, discusses how healthcare organizations are struggling to find new ways to cut healthcare utilization and costs while improving quality and outcomes. The chapter presents a modern data mining tool, decision trees, which may have a broad range of applications in healthcare organizations.

Chapter VIII (Win and Croll), *Engineering Dependable Health Information Systems*, describes health information systems, in particular automated medical record systems and their role in facilitating effective knowledge management. The chapter outlines key aspects for designing robust and appropriate health information systems, providing some frameworks that can assist in their design and then presenting some

case studies that serve to highlight some of the key issues in designing appropriate health information systems.

Chapter IX ( Sharma and Wickramasinghe), e-*Health with Knowledge Management: The Areas of Tomorrow*, emphasizes the need for taking a KM perspective when creating or enhancing the efficiency of e-health. In their chapter, the authors describe how the Internet and related new communication technologies enable health professionals to reach large populations with interactive applications, which in turn open enormous opportunities and challenges. The authors argue that e-health solutions should go beyond merely developing and providing technical solutions and must consider social and human factors involved for providing better healthcare.

Chapter X (Wickramasinghe, Sharma and Reddy), *Evidence-Based Medicine: A New Approach in the Practice of Medicine*, describes how evidence-based medicine deals directly with the uncertainties of clinical medicine and has the potential for transforming the education and practice of the next generation of physicians. According to authors, evidence-based medicine will require new skills for the physician, and would need integration of individual clinical expertise with the best available external clinical evidence from systematic research. An integral part of successful evidence-based medicine will be the incorporation of a knowledge management perspective.

Chapter XI (Shadbolt, Wang and Craft), *Moving to an Online Framework for Knowledge-Driven Healthcare*, describes how knowledge is a critical resource in the provision of healthcare guiding improvements regarding clinical decision making, patient care, health outcomes, workforce quality, and organizational behavior and structure. The chapter is focused on knowledge acquisition associated with clinical decision making, patient care and health outcomes. The authors present a framework Protocol Hypothesis Testing (PHT) "a whole-of-health on-line knowledge-based framework," and examine the development of the PHT approach and software application as a case study.

Chapter XII (Engelkemeyer and Muret-Wagstaff), *Using the Malcolm Baldrige National Quality Award Criteria to Enable KM and Create a Systemic Organizational Perspective*, presents how healthcare leaders face an intensifying array of changes and challenges that heighten the need for systematic approaches to knowledge management at the organizational level. This chapter describes the Malcolm Baldrige National Quality Award and its framework, criteria, and scoring system. It also provides insight into pitfalls as well as successful examples of ways that healthcare groups and institutions are becoming learning organizations, successfully employing cycles of learning and effective knowledge management systems in order to enhance performance and better meet the needs of patients and other customers.

Chapter XIII, the final chapter in this section (Fadlalla and Wickramasinghe), is titled *Realizing Knowledge Assets in the Medical Sciences with Data Mining: An Overview.* This chapter provides a survey of the four major data mining techniques and their application to the medical science field in order to realize the full potential of knowledge assets in healthcare. The authors also presented an enhanced framework of the knowledge discovery process to highlight the interrelationships between data, information and knowledge as well as between knowledge creation and the key steps in data mining.

Section III, *Key Issues and Concerns of Various Knowledge Management Implementations: Evidence from Practice*, includes six chapters.

Chapter XIV (Saito, Inoue and Seki), *Organizational Control Mode, Cognitive Activity & Performance Reliability: The Case of a National Hospital in Japan*, presents the findings of a study based in a Japanese context. The authors identify and verify that cognitive activities, work environment and organizational climate/culture are highly related to human performance reliability and that human performance reliability was predicted by organizational control mode, and emphasize that it is important to focus on the implication of latent variables perceived for tacit knowledge as well as articulate knowledge in KM.

Chapter XV (Al-Qirim), *Tele-Medicine: Building Knowledge-Based Tele-Health Capability in New Zealand*, describes the strategic planning of health information systems in New Zealand identifying the major accelerators and impediments of technology adoption and diffusion as well as the role of knowledge management in tele-medicine.

Chapter XVI (Castleman, Swatman and Fowler), *Aligning Multiple Knowledge Perspectives in a Health Services System: A Case Study*, concludes that the most significant impediment to the effective creation and sharing of knowledge is the highly diffused, fragmented and, interlocking organizational structure of the social service administration itself. Their study examines various issues regarding the design of the underlying organizational system for service provision, the level of details required in the service data and the locus of decision-making power among the stakeholders in order to support the higher-level knowledge that is sought.

Chapter XVII (Hughes and Golden), *Knowing How Intranets Enable Knowledge Work: An Exploratory Study in Public Health*, presents findings from longitudinal case studies conducted in two Irish public sector hospitals. This chapter explores the role of intranet technology as an enabling technology for supporting the knowledge worker, knowledge work and various forms of knowledge management in a hospital setting.

Chapter XVIII (Gammack, Desai, Sandhu and Winklhofer), *Knowledge Management in Indian Companies: Benchmarking the Pharmaceutical Industry*, analyzes the KM scenario in the pharmaceutical industry in India. The authors argue that KM must be incorporated into processes, strategies and organizational culture for successful adoption. The study concludes that there is a heavy orientation toward IT-based conceptions of KM, which may be incompatible with the requirements for future success in the pharmaceutical industry globally.

Chapter XIX, the last chapter in this section (Natarajan and Hoffmeister) is titled *"Do No Harm": Can Healthcare Live Up to It.* The chapter describes an important issue, namely, that of the growing percentage of medical errors. The authors highlight the need for the healthcare sector to learn from other industry sectors and embrace techniques to help decrease the number of errors. The authors believe that the embracing of knowledge management by healthcare organizations will serve to decrease medical errors.

Section IV, *Managing Knowledge as an Asset in Healthcare Organizations*, has five chapters.

Chapter XX (Davison), *Temporary Communication Infrastructures for Dynamic KM in the Complex and Innovative Environment of Palliative Care*, describes managing knowledge face-to-face on a human scale. This chapter emphasizes that knowledge creation is a human activity and, therefore, the organizational effort to create and manage knowledge should be based on anthropocentric rather than techno-centric per-

spectives and the author suggests a personalized approach to knowledge transfer rather than the interaction with a codified knowledge repository.

Chapter XXI (Ahn and Chang), *Managing Healthcare Organizations through the Knowledge Productivity Measurement*, describes how understanding the contribution of knowledge to business performance is important for efficient resource allocations. In this chapter, the author discusses a performance-oriented knowledge management methodology or $KP^3$ methodology that was applied to the medical domain in Korea and how the contribution of knowledge to the performance was assessed.

Chapter XXII (da Cunha and Paiva), *Knowledge Strategic Management in the Hospital Industry*, analyzes the strategic role of organizational knowledge in the Brazilian hospital industry. Results are presented from a group of eight hospitals, which created a cooperative program related to performance measurement systems (SIPAGEH - Standardized Measurement Systems for Hospital Management). The authors present a three-stage approach to analyze the relationship between strategy and knowledge management based on the cases analyzed.

Chapter XXIII (Mundy and Chadwick), *Secure Knowledge Management for Healthcare Organizations*, argues that as the healthcare industry enters the era of knowledge management it must place security at the foundation of the transition. According to authors, in an age where risks and security threats are rapidly increasing, secure knowledge management is an essential business practice. The chapter presents different approaches to minimize security risks based on the concepts of authentication, authorization, data integrity, availability and confidentiality.

Chapter XXIV (Burdick, Hensing, Kirkman-Liff, Nenaber, Silverman and Simington), *Managing Knowledge to Improve Healthcare Quality in Banner Health*, presents the case study of Banner Health. They argue through their case analysis that the one way to gauge the quality of healthcare is to measure its clinical, financial, and service performance. The chapter suggests that even outstanding performance or outcomes need a review to determine how such results can be consistently achieved.