# Preface

Healthcare has long been dependant upon emerging technologies to improve the quality and efficiency of care received. Newer technologies aid in diagnosis and emerging technologies can also simplify the administration aspect of the healthcare industry. As emerging technologies offer newer and innovative methods of managing healthcare related services, healthcare researchers and managers must be able to keep up with these technological innovations and challenges. This book provides insights into some of the latest research finding related to the trends, issues and challenges of information technology utilization and management in the healthcare industry. The following chapters outline the trends in healthcare information systems and communications technologies and provide practical guidance, the latest research and useful case studies describing the successes and pitfalls of technology use in the healthcare industry. From data processing systems to telemedicine, the latest trends are discussed and the most up-to-date research and developments are described.

Chapter 1 entitled, "Strategies for Healthcare Information Systems" by Ton Spil and Robert Stegwee of the University of Twente (Netherlands) addresses the issues of why many large-scale implementations of healthcare information systems has not come to fruition yet. The authors provide broad coverage of the field from strategic analysis to real-life project implementation. This chapter demonstrates that the healthcare organization is a realistic laboratory for information and communication technology students to do research.

Chapter 2 entitled, "Experiences in SIS Implementation in UK Healthcare" by Stuart Barnes of the University of Bath (United Kingdom) stems from a research project focusing longitudinally on the implementation of Case Mix, a program aimed at financial audit processes in four UK hospitals. The chapter reports general findings and details a framework for strategic IS implementation as generated from the cases and supported by current literature.

Chapter 3 entitled, "Technology-Based Marketing in the Healthcare Industry: Implications for Relationships Between Players in the Industry" by Grace Johnson, Anand Kumar, Arkalgud Ramaprasad and Madhusudhan Reddy of

Southern Illinois University at Carbondale (USA) examines how Web technology is affecting the patient-physician relationships through its impact on players and processes both inside and outside a clinic or hospital setting.

Chapter 4 entitled, "The Use of Artificial Intelligence Techniques and Applications in the Medical Domain" by Adi Armoni of Tel Aviv University (Israel) presents a general review of the main areas artificial intelligence and its applications to the medical domain. The review focuses on artificial intelligence applications to radiology, robotically-operated surgical procedures and different kinds of expert systems.

Chapter 5 entitled, "An Intelligent Data Mining System to Detect Healthcare Fraud" by Guisseppi Forgionne, Aryya Gangopadhyay and Monica Adya of the University of Maryland-Baltimore County (USA) begins with an overview of the types of healthcare fraud and a discussion of the current fraud detection. The chapter develops information technology based approaches and illustrates how these technologies can improve current practice. Finally, there is a summary of the major findings and implications for healthcare practice.

Chapter 6 entitled, "Experiences from Health Information Systems Implementation Projects Reported in Canada Between 1991 and 1997" by Francis Lau of the University of Alberta and Marilynne Hebert of the University of British Columbia (Canada) describes the authors' findings on the outcome of information systems implementation projects reported at the Canada's Health Informatics Association conference. The authors review fifty implementation projects published in the conference proceedings and interviewed 24 of the authors or designates of these projects. This chapter is a summary of their findings.

Chapter 7 entitled, "The Role of User Ownership and Positive User Attitudes in the Successful Adoption of Information Systems within NHS Community Trusts" by Crispin Coombs, Neil Doherty and John Loan-Clarke of Loughborough University (United Kingdom) proposes that two factors in the role of success or failure of systems development projects: user ownership and positive user attitudes as issues that warrant further investigation. The authors use the results of a multiple case study of five Community Healthcare Trusts. These results indicate that user ownership and positive user attitudes were mediating variables that were crucial to the success of a community information system.

Chapter 8 entitled, "Introducing Computer-Based Telemedicine in Three Rural Missouri Counties" by Kimberly Harris of Dusquesne University and Joseph Donaldson and James Campbell of the University of Missouri Columbia (USA) investigates the predictors of utilization of the computer-based telemedicine in three rural Missouri counties. The results of a survey given to employees enrolled in the Rural Telemedicine Evaluation Project were analyzed to see how percepts and demographic variables predicted utilization. The authors conclude that strategies

need to be developed to encourage the use of these technologies and suggest possibilities.

Chapter 9 entitled, "VDT Health Hazards: A Guide for End Users and Managers" by Carol Clark of Middle Tennessee State University (USA) outlines major health issues like vision problems, musculoskeletal disorders and radiation effects on pregnancy as evidenced by the literature and medical research associated with VDT. The chapter provides practical suggestions for both end users and managers to help eliminate or reduce the potential negative health effects of VDT use.

Chapter 10 entitled, "The User Interface for a Computerized Patient Record System for Primary Health Care in a Third World Environment" by P.J. Blignaut and T. McDonald of the University of Orange Free State (South Africa) reports on the transition from a manual, paper-based system to a computerized system to keep track of patient history in a black, urban, third world area. The results of the investigation indicate that special attention should be paid to the design of the user interface for systems primarily used by those in the third world who do not want the computer to interfere with or hinder them in their daily tasks.

Chapter 11 entitled, "The Knowledge Medium—A Conceptual Framework for the Design and Implementation of a Platform Supporting the Community of AIDS Researchers and Practitioners" by Rolf Grutter and Katarina Stanoevska-Slabeva of the University of St. Gallen and Walter Fierz of the Institute for Clinical Microbiology and Immunology (Switzerland) uses the Swiss HIV Cohort Study (SHCS) as the core community and starting point of its analysis. Currently, the technical infrastructure supporting the SCHCS includes various legacy laboratory systems at the cohort centers and a relational database system at the coordination Data Center. All data (including data electronically available) are manually processed on a paper study form including various media breaks. As a result, the creation and dissemination of new knowledge based on study data is considerably delayed. This chapter examines a Web-based platform that was designed and implemented based on the concept of knowledge medium.

Chapter 12 entitled, "Mobile Computing at the Department of Defense" by James Rodger of Indiana University of Pennsylvania and Parag Pendharkar and Mehdi Khosrow-Pour of Pennsylvania State University (USA) relates the rationale of the Department of Defense to utilize telemedicine to meet increasing global crises and for the U.S. military to find ways to more effectively manage manpower and time. The chapter discusses a mobile telemedicine package that has been developed by the DOD to collect and transmit near-real-time, far-forward medial data and to assess how this improved capability enhances medical management of the battle space.

Chapter 13 entitled, "Physician Use of Web-Based Technology: Hype vs. Reality" by Linda Roberge of Syracuse University (USA) reports on a survey of 511 physician practice Web sites to assess how the promise of the technology compares to reality. The chapter reports that 94-95% of sites were using one or more site design elements, and providing educational content that would be attractive to potential patients. However, only 73% of the sites provided the professional credentials of the health care providers. It further reports that few sites incorporated legal disclaimers or provided a secure connection for patients.

Chapter 14 entitled, "The Quality of Medical Information on the Internet: Some Current Evaluation Frameworks" by Carmine Sellitto of Victoria University of Technology (Australia) provides an overview of some of the criteria that are currently being used to assess medical information found on the World Wide Web. Drawing from the evaluation frameworks discussed, a simple set of easy-to-apply criteria is proposed for evaluating on-line medical information. The suggested criterion covers the categories of information accuracy, objectivity, privacy, currency and authority. The author also provides a checklist for Web page assessment and scoring.

Chapter 15 entitled, "Information System Failures in Healthcare Organizations: Case Study of a Root Cause Analysis" by Pamela Paustian, Donna Slovensky and Jacqueline Kennedy of the University of Alabama at Birmingham (USA) reports a root cause analysis following an information system failure that compromised the organization's ability to capture clinical documentation for a 33 hour period. The chapter indicates that frequent testing and improvement of the recovery plan is more desirable than a successful recovery in a disaster situation. The authors note that it is essential to maintain effective plans because businesses change so rapidly that constant updating is necessary.

Chapter 16 entitled, "Intermediation Structures in Electronic Healthcare Portals" by Jonathan Wareham and Richard Klein of Georgia State University (USA) focuses upon the healthcare industry, sector of the economy that has witnessed a surge in electronic intermediation. The chapter is founded on a survey of leading healthcare portals and documents and analyzes four predominant patterns of functional intermediation in this new form of an IT-enabled commercial institution. Based upon a historical analysis of healthcare portals, the authors posit functional, generalizable patterns of intermediation.

Chapter 17 entitled, "CORBAMed and DHE Middleware Service Approach in Healthcare Information Systems" by Dongsong Zhang and Ralph Martinez of the University of Arizona (USA) analyzes the status of today's healthcare information systems and the challenges that they have. The chapter further introduces two middleware service frameworks for information systems, namely CORBAMed and DHE in detail. The middleware service can address

heterogeneous problems and significantly assist interoperability of function and the integrity of information systems by providing common services and a set of standard interfaces that enable different applications to interact with each other.

Chapter 18 entitled, "Scanning and Image Processing System (SIPS) for Medication Ordering" by Stephan Chan of Hong Kong Baptist University (Hong Kong) presents a physician order entry system in the ward for medication prescriptions by using scanning and image processing. The chapter presents important design and operational requirements. The chapter describes how SIPS integrates different information technologies including scanning, bar code and other marks recognition. SIPS uses specially designed order forms for doctors to write orders that are then scanned into the computer that performs recognition and image processing. The resulting orders, including the doctor's handwritten images and other order information are transmitted to the destinations electronically. The chapter reports that SIPS reduces human effort and errors and that SIPS is an innovative use of information technology to meet the needs of a hospital that requires paper-and-pen operations. The authors speculate that SIPS can be extended to meet other operational needs as an alternative input method.

Chapter 19 entitled, "Organizational Implementation ad Issues of Patient Data Management Systems in an Intensive Care Unit" by Nathalie Mitev of the London School of Economics and Sharon Kerkham of Salford University (UK) is a case study which details the events surrounding the introduction of a patient data management system into an intensive care unit in a UK hospital. The chapter shows that the implementation was complex and involved organizational issues related to the cost of healthcare, legal and purchasing requirements, systems integration and staff expertise as well as relationships with suppliers.

Chapter 20 entitled, "Studying the Translations of NHSnet" by Edgar Whitley of the London School of Economics and Political Science and Athanasia Pouloudi of Brunel University (UK) explores the ways in which innovative information systems projects take on a life of their own. The chapter begins by reviewing some of the more traditional ways of making sense of this phenomenon: resistance to change, escalation and unintended results, before introducing the sociology of translation. The introduction provides a theoretical framework for viewing the transformations that an information system project undergoes. The framework is then applied to the case of NHSnet project in the United Kingdom. Using the language of sociology translation, the authors consider the underlying stakeholder relations in the case study and draw more general conclusions for the responsibilities of stakeholders involved in an information systems lifecycle.

Telemedicine, healthcare information systems, business process reengineering, the information highway, and disaster recovery planning are just a few of the important topics addressed in this timely new book. The healthcare

industry has always been cutting edge in its use and application of technologies. The chapters in this book represent the best research and practice of information systems, telecommunications, management and information technology as it is applied in healthcare. Leading experts in these fields share their years of expertise and outline the road to successful technology implementation and share practical tips on how to avoid some of the pitfalls that may lie ahead in the implementation of these technologies. This book provides practical guidelines for researchers and practitioners alike. Additionally, the research contained herein is an excellent resource for academicians and students.

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