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(continued after index)
Healthcare Information Management Systems

Cases, Strategies, and Solutions

Third Edition

With 64 Figures
To my beloved husband, Dr. John Charles Ball, to our children, Charles, Elizabeth, Michael, and Debbie, and to our grandchildren, Alexis, Alex, Mike, Ryan, and Erica.

Marion J. Ball

To my mother and father, Betty and Richard Weaver, who raised the nine of us against all odds, and to my son, Kevin, who remains my best project.

Charlotte A. Weaver

To Thomas D. Kiel, MD

Joan M. Kiel
It has often been stated that the hospital and its associated information system is the most complex organizational structure created by people. Therefore, it should not come as any surprise that the implementation of successful healthcare information management systems has lagged commercial, banking, and other nonhealthcare information systems.

Computer-based systems for the management of healthcare information began in the 1960s. During the past four decades, the requirements for healthcare information management systems have continually changed due to frequent major advances in medical technology and the vicissitudes of healthcare legislation. Important changes in medical technology and in healthcare legislation require flexible information management systems that can provide timely and appropriate enhancements.

There is little question that efficient information management systems are essential for the provision of modern, high-quality, cost-effective patient care. High-quality care requires online, clinical decision support for the physician while entering medical orders that are not only consistent with up-to-date, evidence-based, clinical-practice guidelines, but that also minimize the occurrence of drug–drug interactions and medication errors. Cost-effective patient care requires ready access to patient record data whenever and wherever needed by the healthcare professionals. Satisfying all such requirements is possible only with computer-based patient records. Cost-effective care cannot be supported by paper-based patient records that often contain illegible notes and are very time consuming for the physician who needs to search for relevant past data in the bulky paper chart of a long-term patient with a chronic disease.

The implementation of a healthcare information management system is further complicated by the intensive training required of its user healthcare professionals to change their habits and behavior. Users of the system must be frequently retrained to exploit new system enhancements to survive in an increasingly competitive healthcare environment. However, since most healthcare professionals are now computer literate, and most physicians now use computers in their offices, the acceptance of a healthcare information system is less of a problem now than it was a decade ago.

Based on my personal experience since the 1960s with healthcare information management systems, I believe the experiences and wisdom of experts from some of the most advanced systems in the world, which are contained in the third edition of this very practical guide, will be of inestimable help to anyone involved in implementing a new healthcare information management system or in operating an existing system.

Morris F. Collen, MD
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Marion J. Ball, Charlotte A. Weaver, and Joan M. Kiel present to us a book that is a chronicle of numerous recent Information Technology (IT) success stories, a roadmap for continued development, and a vehicle for knowledge sharing that will benefit future IT implementations.

This compilation provides a snapshot of the state of health care IT today. The book’s diverse collection of industry insights and strategic analyses combines with many domestic and international case studies to connect the interrelated threads—revealing how each element is tied to the complex tapestry of health care.

This book is also about the future, in two distinct ways. First, it contains forward-thinking accounts of where today’s advancements are heading and where the next great opportunities lie. It provides a vision of health care’s future, with progressive phases characterized by increasing connectedness, responsiveness, and collaboration.

On a second, more valuable level, this book provides a vehicle for knowledge sharing and continuous improvement that organizations will use to cultivate a new generation of success stories. It shares not only results, but also descriptions of how those results were achieved. This book gives you many detailed accounts of real change in real organizations. In doing so, it reveals the various detours and roadblocks along the road that start with IT systems and end in organizational transformation.

When viewed as a whole, certain common threads emerge from the collection of individual submissions. Among them:

• A recognition of the universal value of planning.
• An emphasis on the management of human factors, not just the technology.
• A persistent focus on the customer as a guide for decisions.
• An understanding that true transformation goes beyond the automation of existing processes:

The healthcare leaders who contributed to this book have done more than advance the cause of IT in their organizations. They have taken a vital extra step by sharing their stories for the benefit of the greater healthcare community. Now, we may all learn their lessons, build on their progress, and move closer to our common vision. So, as it helps us see a transformed future for health care, this book actually helps us create a future of better care through technology.

Judith R. Faulkner
Chief Executive Officer
Epic Systems Corporation
This series is directed to healthcare professionals who are leading the transformation of health care by using information and knowledge to advance the quality of patient care. Launched in 1988 as Computers in Health Care, the series offers a broad range of titles: some are addressed to specific professions such as nursing, medicine, and health administration; others to special areas of practice such as trauma and radiology. Still other books in the series focus on interdisciplinary issues, such as the computer-based patient record, electronic health records, and networked healthcare systems.

Renamed Health Informatics in 1998 to reflect the rapid evolution in the discipline now known as health informatics, the series continues to add titles that contribute to the evolution of the field. In the series, eminent experts, serving as editors or authors, offer their accounts of innovation in health informatics. Increasingly, these accounts go beyond hardware and software to address the role of information in influencing the transformation of healthcare delivery systems around the world. The series also increasingly focuses on “peopleware” and the organizational, behavioral, and societal changes that accompany the diffusion of information technology in health services environments.

These changes will shape health services in the new millennium. By making full and creative use of the technology to tame data and to transform information, health informatics will foster the development of the knowledge age in health care. As coeditors, we pledge to support our professional colleagues and the series readers as they share the advances in the emerging and exciting field of health informatics.

Kathryn J. Hannah
Marion J. Ball
Preface

It has been nine years since publication of the Second Edition of Healthcare Information Management Systems: A Practical Guide. In computer time, nine years is six lifetimes of computers, given that computers are replaced every 18 months. Not only has the technology itself changed, but so have the economics of computing, the planning process of system implementation, and the human–computer interaction. On the healthcare side, change has been omnipresent with events such as the Health Insurance Portability and Accountability Act (HIPAA), cost-based proposals such as Medicare reform, the development of strategies for disease management, and managed care reform. When one considers changes that have occurred in the integration of information technology and health care, more wonders appear—the use of personal digital assistants to track patient progress, online patient registration, electronic medical records that patients can access from home, technology as an enabler to quality health care, and healthcare providers who work in a paperless environment. So comparing this edition to the second one, only six chapter topics are based on the same concepts. In a sense, this is the first edition of an entire new philosophy of healthcare computing. But given the dynamics of the current healthcare environment, it will enjoy the same success of the first two editions, if not more.

In the past nine years, new roles have emerged in healthcare computing. No longer is the chief information officer the only player. In today’s healthcare environment, other team members have made their appearances, such as the nurse informatician, compliance officer, health information administrator, medical technology officer, security officer, network developer, multimedia coordinator, project manager, technology planner, systems analyst, and the future of health informatics—the student—and the faculties that build that future. All these essential players will benefit from this book. In addition, in recognition of the global character of health care, this book also conveys an international flavor with case studies taken from several corners of the world.

Think about what is involved in either upgrading your present healthcare information systems or embarking on an initiative to explore new technologies. First, you need to develop a plan, perhaps with the help of consultants, and devise a strategy to exercise that plan. In doing so, you can talk to those who have accomplished something similar, either in your country or abroad, and you can review case studies that tie theory to practice. Your journey may not be without obstacles; thus, those who have come before you can provide tried and true lessons from which to learn. This is the premise of Section 1, Chapters 1 to 6. Section 2, Chapters 7 to 11, recognizes that the plan is well underway, but that it must exist within an organizational structure. This section discusses how the organization readies itself for change. It must consider organizational
politics, ethics, decision factors, culture, and change agents. Without a thorough analysis of these factors, the healthcare information management system will not ingrain itself into the organization, and, thus, optimal benefits will not be realized. Given this book’s theory to practice approach, you will be taken precisely through the steps needed to accomplish this. And this is done in Section 3, through the eyes and minds of those who have lived the experience—the Chief Information Officers and their staffs. Chapters 12 through 22 in this section, convey the “worker bee’s” perspective in terms of what it actually takes to transform an organization via information technology and what is actually involved in managing implementation. At times the scenarios may seem futuristic, but these experiences are actually happening, and the dissemination and duplication of sophisticated healthcare information systems is a reality. The reader will notice, however, that are no guarantees or promises of success; rather, one must be daring to confront and overcome obstacles, politics, and culture.

As the book progresses to Section 4, you will become immersed in the utilization and consequences of information technology across the continuum of care. HIPAA, outcomes management, the electronic health record, patient safety, medical errors, pharmacy delivery systems, and so on will showcase just how technology is an enabler in health care. Although the content of the whole book revolves around the patient as the center, this section, in particular, takes a patient-centric approach in portraying the patient as the driver in the utilization of technology. No one who uses this book will walk away a naysayer. In fact, the enthusiasm exuded by these examples is so infectious, both on a domestic and on an international level, that one is tempted to run and start the process of transformation. But wait—Section 5 takes you even further into the future, but with technologies that are, literally, just around the corner. Soon telehealth, evidence-based medicine, Web-enabled medicine, and public health surveillance will become commonplace.

Author-contributors to this book lived their individual chapters, thus making this book highly readable and applicable. This book will become for you a “how to” guide, a technology manual, a planning tool, and so much more as you take on a role in creating a new future for health care. We hope that you will enjoy this book—not only reading it, but also putting into practice information technology as an enabler of quality health care.

Marion J. Ball
Charlotte A. Weaver
Joan M. Kiel
Acknowledgments

The idea for this book emerged out of a need to showcase the rapid changes that are occurring in healthcare information systems today. As you can imagine, the field is rich not only with savvy information technologies and case studies, but more importantly with the people behind them. There are many stories that help us share the wonders of this technology. The Third Edition of this volume captures some of the best, and we thank the following people for helping us bring them to you.

Our greatest thanks go to Nhora Cortes-Comerer, a consulting editor in the field of healthcare informatics, who was extraordinarily supportive through all phases of this project. Her advice and guidance contributed significantly to the overall content and development of this book. Without her dedication, this book would not have been possible.

We would also like to thank our colleagues in our respective professional communities for their support and contributions, in particular, Ivo Nelson, President of Healthlink Incorporated; Dave Garets, Senior Vice President of Healthlink Incorporated; Neal Patterson, CEO of Cerner Corporation; Peter Valotta and Julie Smith of Duquesne University; and Dan Swain.

A resounding thank you also goes out to all the authors and coauthors of the many chapters in this book for their cooperation and commitment in telling the story of healthcare information candidly and professionally.

Many of our colleagues behind the scenes also contributed their time, ideas, and creativity. We are indebted to Dana Sellers, Melinda Costin, Karen Knecht, Andra Granek, Ken O’Quinn, and Amanda LeBlanc of Healthlink Incorporated, and April Martin, Russ Pedersen, Karen Colston, Ann Wurster, Marikay Menard, and Amanda Hurd of Cerner Corporation.

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Marion J. Ball
Charlotte A. Weaver
Joan M. Kiel
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