



HEALTHCARE INFORMATION TECHNOLOGY EXAM GUIDE
FOR CHTS AND CAHIMS CERTIFICATIONS



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This book is dedicated to our families, since books are “family affairs.” We express gratitude for our family members’ support, encouragement, and patience while we took evenings and weekends away from them to write the book and coordinate the chapters.

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Brian Gugerty dedicates the book to Kathleen Bartley, his wife, Sean, Ryan, and Dylan, his sons, and to the memory of Helen M. Gugerty, R.N., and Leo J. Gugerty.

John dedicates the book to Mindy, his wife, Shawn, Michelle, and Heidi, his children, and his parents Jim and Joanne, who inspired us all toward kindness and service to others.

The book is also dedicated to the HIT professionals, clinical informaticians, and STEM professionals in healthcare organizations, HIT-focused companies, government agencies, and professional associations that the authors have been privileged to work with, learn from, and be inspired by.

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A recent keynote video featuring Dr. Mattison is available for viewing at <https://exponential.singularityu.org/medicine/innovation-at-scale-virtues-of-plecosystem-approach-with-john-mattison/>.

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Part V: Optimizing Healthcare IT

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Part VI: Making It All Secure: Healthcare IT Privacy, Security, and Confidentiality

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FOREWORD

Every year, I travel a few hundred thousand miles helping governments craft healthcare IT strategy. The culture in each country is different but the problems are the same all over the world. This book is an invaluable reference for understanding what has come before and what trends are likely to shape the future.

The authors are a who's who of the advisors and consultants who shaped thousands of pages of federal regulations across the past two U.S. presidential administrations. As the chair of the Bush-era Healthcare Information Technology Standards Panel and the co-chair of the Obama-era Healthcare Information Technology Standards Committee, I worked side by side with these authors and I can say with confidence that they have an inside view of the "sausage being made."

Part I of this book covers healthcare information technology in the United States, but the concepts it relates from the past two decades of policy apply globally. The United States spends 17 percent of its gross domestic product on healthcare and yet does not lead the world in quality, safety, or efficiency. The United States must move from a fee-for-service reimbursement to value-based purchasing—paying for outcomes and quality—if it is to bend the cost curve. The IT tools necessary to keep people healthy are quite different from those needed to document episodes of care when they are sick. Part I provides valuable insights into the care coordination tools needed in the future to reduce cost and improve quality. Although the Obama administration's Meaningful Use program has had mixed results, public health reporting of immunizations, syndromic surveillance, and reportable lab results has been implemented successfully at a national scale. You'll learn how that was achieved in Chapters 1–4.

In Part II, you'll learn about the major issues shaping health information science. Today's hot trends include team-based communication, mobile computing, analytics, and cloud computing. In 2017 and beyond, I believe that the role of IT leaders will fundamentally change from choosing and integrating the best technology to managing complex projects successfully and ensuring a highly usable result. All of these issues are discussed in Chapters 5–12.

Part III focuses on standards and regulation. An old joke notes "the great thing about healthcare IT standards is that there are so many of them." Creating standards is complex and involves harmonization of multiple stakeholders with a near infinite number of use cases. What is the difference between harmonization and compromise? Harmony means that everyone is happy with the consensus. Compromise means that everyone is equally unhappy with the consensus. Since standards are adopted by consensus, achieving harmony means that standards include a little bit of everyone's wish list. The danger is that a consensus approach to designing a duck could produce a platypus—it's supposed to be a bird with feathers but turns out to be a mammal with hair. You'll hear from experts about the Meaningful Use standards and how we attempted to balance the needs of the many with a relatively low burden for developers, then wrote it into regulation.

Part IV focuses on the day-to-day operations of healthcare IT organizations. I've been a CIO for 20 years, and during that time, we've evolved from products that had to be self-developed to highly reliable commodity services available at reasonable cost. Keeping IT running flawlessly while also introducing continuous improvement/change takes hands-on management and a thick skin. You'll hear from leaders in the trenches in Chapters 18–22.

Part V focuses on innovation. I sometimes describe introducing new technologies into mission-critical production systems as changing the wings on a 747 while it's flying. The world of big data, precision medicine, genomics, and telehealth requires us to break old paradigms of architecture and functionality while not interrupting existing care processes and revenue cycles. There are risks, but risks can be mitigated with appropriate planning. You'll learn how in Chapters 23 and 24.

Part VI focuses on security. Today, as CIO, I spend 25 percent of my time on security-related matters. The new threats are no longer bored college students. We're dealing with state-sponsored cyberterrorism, hacktivism, and organized crime. I describe healthcare IT security as a cold war. The faster the good guys innovate, the faster the bad guys innovate. We're asked to share more data with more stakeholders for more purposes but never spill a single byte. It's an impossible task. You'll hear from the experts who created many of the regulations and best practices we're using today to keep information private.

I hope you enjoy this book as much as I have and that it finds a place of importance on your bookshelf. Regardless of the political and economic divisiveness we'll encounter in the world over the next few years, we know that healthcare IT automation is a universal priority in every society to optimize existing resources and keep our aging societies as healthy as possible. Be well!

John Halamka, M.D., M.S.
International Healthcare Innovation Professor at Harvard Medical School
Chief Information Officer of the Beth Israel Deaconess System
and a practicing emergency physician

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Behind all of us was a team from McGraw-Hill Education that is matched by no other in the dedication and commitment to pursuing what the healthcare information technology domain requires at this time. This team includes the leadership of Tim Green, executive editor, International and Professional Group; Claire Yee, editorial coordinator; and the legal department, which we challenged with dozens of individual contracts. Tim provided special leadership in creating a book that provides a vision in a creative way that is responsive to the CAHIMS and CHTS exams.

When production started, we were joined by a team of specialists: Howie Severson, project manager for copyediting and page proofs; Bill McManus, copy editor; Janet Walden, editorial supervisor from McGraw-Hill Education; and Paul Tyler, references editor and proofreader. What a dedicated team to maintaining quality, readability, and format.

Finally, the book's online learning center can be attributed to the dedicated team working with Amy Stonebraker, acquisitions editor, and Claire Yee. Joining that team were Juliana Brixey, Jack Brixey, and Vanessa Buckley, who developed the online teaching outlines, test bank of questions, and PowerPoint slides.

Additional Resources for Instructors

Whether used as a self-study guide or a classroom text, this book is designed to prepare readers for the AHIMA CHTS and HIMSS CAHIMS, as well as the field of healthcare information technology.

For those using this book in a classroom, please visit this book's Online Learning Center:

<http://highered.mheducation.com/sites/1259836975/>

The Online Learning Center provides instructor support materials in a format that follows the organization of this book. On this site you will find the following:

- An instructors' manual that contains learning objectives, classroom preparation notes, instructor tips, and a lecture outline for each chapter
- Engaging PowerPoint slides on the lecture topics
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PART I

Healthcare and Information Technology in the United States

- **Chapter 1** Healthcare Information Technology: Definitions, Stakeholders, and Major Themes
- **Chapter 2** U.S. Healthcare Systems Overview
- **Chapter 3** An Overview of How Healthcare Is Paid for in the United States
- **Chapter 4** Healthcare Information Technology in Public Health, Emergency Preparedness, and Surveillance

Healthcare Information Technology: Definitions, Stakeholders, and Major Themes

Kathleen A. McCormick, J. Marc Overhage,
John E. Mattison, Brian Gugerty

In this chapter, you will learn how to

- Define the complex evolution of the computer network environment in healthcare information technology (HIT)
- Explain the fast uptake of HIT in the continuum of healthcare
- Describe how the increase in volume of HIT has expanded the capabilities to measure the value of healthcare
- Describe the need to prepare an adequate workforce aware of the unique HIT environment
- Define the roles of HIMSS and AHIMA in support of HIT credentialing, education, and training

This chapter provides an overview of some of the updated content in this second edition as well as new content pertaining to the rapid advances in healthcare information technology (HIT). These rapid advances will be briefly mentioned in this introductory chapter and further defined in later chapters. The evolution of HIT has occurred from simple systems to much more complex computer network environments.¹ With this expansion, the technology has become a component of the entire continuum of care, which results in silos of information and data on individuals and communities of people. The need for integrated networks, standards, and security/cybersecurity has intensified as these systems are more commonly being used to increase the volume of HIT and monitor the value of healthcare.

The new generation of healthcare IT personnel must have adequate knowledge and skills to participate in the workforce delivering services and technology. Achieving certification is the best way for these technology and healthcare professionals to demonstrate proficiency with a standard body of knowledge endorsed by professional healthcare organizations. Two types of certification are the focus of this second edition. The first, Certified Associate in Healthcare Information and Management Systems (CAHIMS), is awarded by the Healthcare Information Management Systems Society (HIMSS). CAHIMS is a professional certification for emerging professionals who may not have a lot of experience in healthcare IT but seek a career in the field. The other is the Certified Healthcare Technology Specialist (CHTS) series from the American Health Information Management Association (AHIMA). This series originated with the Office of the National Coordinator for Health Information Technology (ONC) HIT Pro categories of exams and covers six IT roles for people in health information management. Both certifications will be described in more detail later in this chapter.

The Explosion of Healthcare Information Technology

During the past decade, the following factors have contributed to massive expansion in healthcare IT:

- A huge increase in the number of connected networks and network-enabled devices (commonly called the Internet of things [IoT])
- Access to healthcare through mobile devices, patient portals, and cloud services
- Critical cybersecurity threats
- Integration of healthcare networks
- The volume of genomics data
- The need to analyze big data

With this expansion in HIT, the healthcare informatics community has also come to realize that data standards are required to truly achieve interoperability and to mine the data for quality, efficiencies, effectiveness, and cost. In addition, the consumer has embraced direct-to-consumer genomics, mobile devices, portals, and the Internet. Consumers now demand secure and easy access to their healthcare information via healthcare apps on their mobile devices and via the Web on their home computers. When the authors defined the necessary components to understand healthcare IT in the first edition of this book, the enterprise architecture was fairly simple, consisting of a boundary, a network, a data center containing servers located in a defined, secure area, and desktop computers within a closed network. Contrast that to the time of writing of this second edition, and the architecture now contains mobile devices connected from any