



Transition Guide

Health Informatics: A Systems Perspective
Second Edition

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Health Informatics: A Systems Perspective takes a systems approach to leveraging information in healthcare and enhancing providers' capabilities through the use of technology and knowledge transfer. The book offers a conceptual framework for aligning clinical decision processes with system infrastructures, including information technology, organizational design, financing, and evaluation. An essential resource for students and practicing managers alike, *Health Informatics: A Systems Perspective* explains how information technology can enable the transformation of health organizations to improve not only the quality of healthcare, but also the health of individuals and populations.

Changes in the Second Edition

Thoroughly updated and revised, the second edition includes three new chapters on information systems in relation to population health, global health systems, and alternative financial mechanisms and their compatibility with innovative delivery models. The change in content and sequencing of chapters in this edition strengthens the systems focus of the book. The authors give greater emphasis to information as a transforming technology, how it will transform roles and behaviors of patients and families, the education and practice of health professionals, the structure of health organizations and systems, financing, the quality of health services, and the health of populations. Discussions of contemporary operational problems and challenges associated with information technology are included, but the book becomes more strategic in its orientation.

Chapter 1 – Health Systems Informatics: A Transformational Science

An open systems conceptual framework is developed as a basis for transformational change that information provides, and how information technology can provide the architecture for structuring such a system. Health systems informatics build on information sciences as its pertinent for of bio and clinical informatics.

Chapter 2 – Knowledge-based Decision Making

Information and knowledge are among the few assets in systems that add value the more they are used. This chapter explores the storage and use of explicit knowledge as well as the generation of tacit knowledge derived from interaction among professionals. The process and value of knowledge transfer among individuals, groups and communities of practice is explored.

Chapter 3 – Health Professions, Patients, and Decisions

Medical and nursing functions will change in a transformed health system but will be enhanced and not diminished. Research on clinical decision-making based on decision science is presented to inform policy direction. A case on adding information and decision sciences along with engineering principles to basic and clinical sciences within a new medical school is presented.

Chapter 4 – The Coming of the Corporation: Transforming Clinical Work Processes

The traditional logic and design of health organizations and systems is explored in relation to the structure of the clinical function. New system designs are explored based on the logic of information exchange and clinical decision support. The design of medical homes and accountable care organizations is examined in terms of their strengths and how they can be improved.

Chapter 5 – Predictive Analytics in Knowledge Management

This chapter critically examines how knowledge is derived and clinical decisions are made from data mining and analytics. The concept of big data is examined with regard to integrating existing databases. Dynamic systems modeling is discussed as a method of testing alternative system models by replicating the complexities of the real world in order to design, change, and improve systems based on advanced information technology.

Chapter 6 – Clinical Decision Support in Medicine

The chapter explores access to needed information at the point of care for clinically oriented solutions. It relates physician access to high quality, specialized clinical, organizational, and pharmaceutical information with clinical decision making and outcomes.

Chapter 7 – Nursing Informatics

The chapter explores the role of nurses as knowledge workers in the health care arena. It explores the clinical workflows in nursing that involve informatics applications and how they affect continuity, quality of care, and satisfaction. The design and importance of inter-professional collaboration is developed. The chapter explores the integration of nursing informatics education and research in the advancement of nursing in health care.

Chapter 8 – E-health and Consumer Health Informatics

It explores different platforms that support e-health applications including mobile devices etc. and their potential for supporting changes in the role of the patient and the doctor-patient decision process. The chapter examines consumer health informatics concepts and their role in the design of e-health systems and critically assess implications and barriers of health social networks. It includes discussion of the ethical and practical considerations pertaining to the use of consumer facing technologies

Chapter 9 – Precision Medicine

Precision genomic medicine is having a transformative impact on medical practice, personal health and wellbeing, health economics and national productivity. This science encompasses disease diagnosis and personalized genetic health. The importance of Big Data to Precision Medicine is discussed as a concept and as a knowledge-based system. The recognized crisis of reproducibility of biomedical science is explored in the context of evidence-based healthcare.

Chapter 10 – Information Systems as Integrative Technology for Population Health

NEW CHAPTER IN SECOND EDITION. This new chapter develops a systems model for placing population health at the core of the medical care system. The rationale for such a model has long existed but systems to deliver it are complex and most have been limited or failed. The complexity results from a fundamental failure in the design of all dimensions of the system (training, financing, work design etc.) which cannot be addressed incrementally.

Chapter 11 – Global Health Systems or Information Exchange

NEW CHAPTER IN SECOND EDITION. This new chapter addresses 1) innovations in health information systems in a range of developed and developing nations, 2) generating and sharing clinical evidence and decision support, and 3) the potential for developing loosely configured global health systems. The chapter embraces the value that all healthcare is local, but information and knowledge-systems are global, and how these concepts can be integrated.

Chapter 12 – Controlled Terminology and Data Representation

This chapter discusses the basic components, uses and importance of concept-based controlled biomedical terminologies. It explains the basic aspects of the terminology problem, its relation to interoperability of information and the technical challenges and approaches to connected systems. It includes discussion of controlled vocabularies, metadata information exchange, and interoperability. The chapter explores current information exchange technologies and their potential for the future. Particular emphasis is placed on challenges for the implementation of standards across a system.

Chapter 13 – Information Management Strategy.

Written by a recognized industry leader, this chapter describes operational issues related to information management strategy. Strategy is conceptualized as an organization's plan to acquire, manage, utilize, and deliver information to customers whether internal or external through products or services. Types of architecture and scope of information systems are described as the basis for selecting an IT system and the rationale and challenge of changing systems. Topics include data governance and value.

Chapter 14 – The Crucial Role of People and Information in Healthcare Organizations

This chapter includes new content on the transformation of the human resources function in a knowledge-based system. The traditional human resources function has proven to be one of the most resolute functions in health systems. Discussion includes skills and capabilities for managing intellectual capital and creating value in organizations and systems. Models and evidence are presented on teamwork, including inter-organizational teams.

Chapter 15 – Financing of Health Services and Valuation of Information Infrastructure

NEW CHAPTER IN SECOND EDITION. This new chapter examines alternative financial mechanisms and their compatibility with innovative delivery models. They are used to assess current and propose changes to medical homes and ACO designs. There is an assessment of health financial exchanges (HFE) and other financial structures aligned to support new information-based delivery models. Valuation of investment in IT is explored with regard to how value is realized and who should invest in the IT infrastructure.

Chapter 16 – Data and Information Security in the Healthcare Enterprise

Privacy and security principles, resources that track threats and their application to changing health information technology are explored. Readers are able to conceptualize the logical relationship among privacy, security, and safety and understand the interactions and inter-effects between safety and security from both an individual healthcare and public health perspective. Increasing risks due to technologies such as the rapid development of mobile devices, the cloud, and the threats to privacy and security in the Internet of Things are explored. Security and privacy risks of applying data mining analytics and internal cyber risks and security are examined, and readers are able to identify and develop arguments to support the principles of fair information practices and identify the technical safeguards required by the HIPAA Security.