

Student Study Guide to Accompany

NURSING INFORMATICS FOR THE ADVANCED PRACTICE NURSE

Patient Safety, Quality, Outcomes, and Interprofessionalism

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CONTENTS

Chapter 1: Introduction to Health Information Technology in a Policy and Regulatory Environment 1

Chapter Summary 1

Key Items 1

Glossary Terms 2

Chapter 2: Advanced Practice Roles in Interprofessional Teams 4

Chapter Summary 4

Key Items 5

Glossary Terms 5

Chapter 3: Scientific and Theoretical Foundations for Driving Improvement 8

Chapter Summary 8

Key Items 9

Glossary Terms 9

Chapter 4: National Health Care Transformation and Information Technology 10

Chapter Summary 10

Key Items 10

Glossary Terms 11

Chapter 5: Consumer Engagement/Activation Enhanced by Technology 12

Chapter Summary 12

Key Items 13

Glossary Terms 13

Chapter 6: Computers in Health Care 14

Chapter Summary 14

Key Items 14

Glossary Terms 15

Chapter 7: Electronic Health Records and Point-of-Care Technology 16

Chapter Summary 16

Key Items 16

Glossary Terms 17

Chapter 8: Systems Development Life Cycle for Achieving Meaningful Use 18

Chapter Summary 18

Key Items 19

Glossary Terms 19

Chapter 9: Workflow Redesign in a Quality Improvement Modality 21

Chapter Summary 21

Key Items 21

Glossary Terms 22

Chapter 10: Evaluation Methods and Strategies for Electronic Health Records 23

Chapter Summary 23

Key Items 23

Glossary Terms 24

Chapter 11: Electronic Health Records and Health Information Exchanges Providing Value and Results for Patients, Providers, and Health Care Systems 25

Chapter Summary 25

Key Items 26

Glossary Terms 26

Chapter 12: National Standards for Health Information Technology 27

Chapter Summary 27

Key Items 27

Glossary Terms 28

Chapter 13: Public Health Data to Support Healthy Communities in Health Assessment Planning 29

Chapter Summary 29

Key Items 29

Glossary Terms 30

Chapter 14: Privacy and Security in a Ubiquitous Health Information Technology World 31

Chapter Summary 31

Key Items 32

Glossary Terms 32

Chapter 15: Personal Health Records and Patient Portals 33

Chapter Summary 33

Key Items 33

Glossary Terms 34

Chapter 16: Telehealth and Mobile Health 35

Chapter Summary 35

Key Items 35

Glossary 36

Chapter 17: Strategic Thinking in Design and Deployment of Enterprise Data, Reporting, and Analytics 37

Chapter Summary 37

Key Items 37

Glossary 38

Chapter 18: Data Management and Analytics: The Foundations for Improvement 39

Chapter Summary 39

Key Items 39

Glossary 39

Chapter 19: Clinical Decision Support Systems 41

Chapter Summary 41

Key Items 41

Glossary 42

Chapter 20: Health Information Technology and Implications for Patient Safety 43

Chapter Summary 43

Key Items 43

Glossary 44

Chapter 21: Quality Improvement Strategies and Essential Tools 45

Chapter Summary 45

Key Items 45

Glossary 45

Chapter 22: National Prevention Strategy, Population Health, and Health Information Technology 47

Chapter Summary 47

Key Items 47

Glossary 48

Chapter 23: Developing Competencies in Nursing for an Electronic Age of Health Care 49

Chapter Summary 49

Key Items 49

Glossary 49

Chapter 24: Genomics and Implications for Health Information Technology 50

Chapter Summary 50

Key Items 50

Glossary 51

Chapter 25: Nanotechnology and Implications for Health Care Interprofessional Teams 52

Chapter Summary 52

Key Items 52

Glossary 52

Chapter 26: “Big Data” and Advanced Analytics 53

Chapter Summary 53

Key Items 53

Glossary 53

Chapter 27: Social Media: Ongoing Evolution in Health Care Delivery 54

Chapter Summary 54

Key Items 54

Glossary 54

Chapter 28: Electronic Clinical Quality Measures: Building an Infrastructure for Success 56

Chapter Summary 56

Key Items 56

Glossary 56

**Chapter 29: Interprofessional Application of Health Information Technology
in Education 57**

Chapter Summary 57

Key Items 57

Glossary 57

CHAPTER 1

Introduction to Health Information Technology in a Policy and Regulatory Environment

■ CHAPTER SUMMARY

This chapter explains the legislation and processes in place to implement the National Quality Strategy (NQS) specifically the Health Information Technology for Economic and Clinical Health (HITECH) Act. This act identifies three phases in order to meet the NQS goals of better care, affordable care, and healthy populations and communities. The HITECH phases are: 1) implement health information technology (HIT) to exchange information and capture/report quality metrics; 2) consumer engagement and maximize the capture and exchange of data; and 3) improve quality reporting to maximize data capture supporting population health management and measure outcomes while emphasizing patient-centered care. These phases are essential to support meaningful use (MU).

Health care providers and hospitals are incentivized to achieve MU by payments from the Centers for Medicare and Medicaid (CMS). All of these actions are supported through the Patient Protection and Affordable Care Act (PPACA) which does not mandate the use of HIT but is indirectly connected through the mandate of MU standards. If these standards are not achieved MU is not met and reimbursement levels and incentives will be withheld. The approaches to meet MU include using technology to lower cost and improve safety, assuring patient quality safety in an environment driven by technology, and maximizing the role of the nurse in an environment driven by HIT.

The nurse's role is paramount in this new technological-driven healthcare environment. The informatics nurse has been recognized by the American Nurses Association since 1992 as an integral role. Standards and scope of practice for the informatics nurse reflect the informatics nurse as a specialty practice. However this role needs to move beyond measuring medication administration and nursing documentation.

A framework has been developed that addresses the major roles of advanced practice registered nurses within the information technology environment. The framework has three domains: 1) patient safety/quality; 2) data management and analytics; and 3) point-of-care technology. This framework was adjusted to address the specific role of nursing informatics, renamed as Nursing Education for Healthcare Informatics [NEHI] and includes the domains of: 1) point-of-care technology; 2) data management and analytics; and 3) patient safety/quality and population health. The balance of the text is designed to support the NEHI model.

■ KEY ITEMS

- Relationship of the National Strategy for Quality Improvement in Health Care with the Patient Protection and Affordable Care Act (PPACA)
- Regulatory standards of the Health Information Technology for Economic and Clinical Health (HITECH) Act

- Relationship of the Centers for Medicare and Medicaid meaningful use standards with the HITECH Act
- Affordable Care Act (ACA) five domains of measurement
- The three phases of meaningful use as identified by the HITECH Act
- Similarities and differences between the Medicare and Medicaid meaningful use criteria
- Criteria for vendors under the HITECH Act
- The role of patient engagement with the HITECH Act and meaningful use
- Role of the informatics nurse to ensure patient care quality and safety with HIT
- Institute of Medicine's expectations of the advanced practice nurse with the implementation of the Affordable Care Act
- Domains within the Nursing Education for Healthcare Informatics [NEHI] framework
- Use of the NEHI framework to organize the study of nursing informatics

■ GLOSSARY TERMS

Accountable care organization (ACO): provider organizations take on the responsibility of patient populations for which they provide care at a fixed rate per person

Centers for Medicare and Medicaid Services (CMS): Federal organization responsible for overseeing the Medicare and Medicaid programs

Data management and analytics: reflects applied information management tools such as business intelligence tools and statistical software programs to transform data and information into improved health care delivery

Electronic health records (EHR): medical records which are maintained electronically

Health Information Technology (HIT): the use of computer technology to manage health information

Health Information Technology for Economic and Clinical Health Act (HITECH): legislation passed as part of the American Recovery and Reinvestment Act (ARRA) which identifies two sets of standards established as regulatory requirements to help providers meet meaningful use of Electronic Health Records (EHRs) and to assure that the EHRs across the nation meet an adequate standard for performance

Meaningful use (MU): process implemented in a series of phases to demonstrate utilization of EHRs and the impact on health

Nursing Education for Healthcare Informatics (NEHI): model of care designed to enhance advanced practice care delivery

Nursing informatics (NI): specialty that integrates nursing science with multiple information and analytical sciences to identify, define, manage, and communicate data, information, knowledge, and wisdom in nursing practice.

Patient engagement: demonstration of the patient as being a partner in healthcare

Patient Protection and Affordable Care Act (PPACA): legislation that focuses on providing all Americans with access to quality and affordable healthcare

Patient quality: achievement of metrics to ensure care provided is within identified standards of care

Patient safety: achievement of metrics to ensure care provided is within identified safety standards of care; a domain of the NEHI framework

Point-of-care technology: reflects the use of technology in patient care delivery; a domain of the NEHI framework

Population health: reflects quality improvement tools applied to individuals and health initiatives

CHAPTER 2

Advanced Practice Roles in Interprofessional Teams

■ CHAPTER SUMMARY

The healthcare industry in the United States has provided long-term stable employment for a variety of care providers. With the implementation of health information technology (HIT) the need for expert providers to function as an interprofessional team is paramount.

HIT impacts all levels of care providers: advance practice nurses, physician assistants, physical therapists, occupational therapists, dietitians and nutritionists, pharmacists, behavioral health professionals, health care administration professionals, HIT professionals, and informatics nurse specialists. Of this group the ones most prepared for HIT are the informatics nurse specialists. These nurses are in the pivotal position to support other interprofessional team members while serving as liaisons for health care consumers and patients.

All interprofessional team members must demonstrate competency in informatics which is no easy feat since many of the professions such as physical and occupational therapists, dietitians and nutritionists may have limited support with the information technology.

The American Nurses Association (ANA) identified nursing informatics (NI) as a nursing specialty in 1992 and since then has published standards of practice which have been reviewed and updated periodically through 2015. These standards identify expectations for all nurses regarding HIT.

The American Association of Colleges of Nursing (AACN) which publishes documents that identify and direct inclusion of essential content within all nursing curricula has included specific content addressing information technology and what each learner is expected to achieve. Additional education requirements for HIT have been prepared by the National League for Nurses (NLN), Quality and Safety Education for Nurses (QSEN) project, and the Technology Informatics Guiding Education Reform (TIGER) initiative.

As was previously introduced, the Nursing Education for Healthcare Informatics (NEHI) model addresses 1) point-of-care technology, 2) data management and analytics, and 3) patient safety, quality, and population health associated with integration of informatics.

In 2009 the Interprofessional Education Collaborative (IPEC®) created core competencies for interprofessional collaborative practice to guide curricula development at all health professions schools. This effort was supported by documents prepared by the World Health Organization (WHO), Institute of Medicine (IOM), and MIT. From these documents, the Interprofessional Team Competencies were created to include: utilize informatics, provide patient-centered care, employ evidence-based practice, and apply quality improvement.

Interprofessional teams have gained support through the National Quality and National Prevention strategies which identify strategic directions and targeted priorities designed to improve health and wellness for all Americans.

However the HITECH Act and the expectation to prove meaningful use do not recognize the importance of interprofessional teams to improve access, improve health care, and reduce costs.

■ KEY ITEMS

- Ongoing need for health care professionals in the United States
- Interdisciplinary teams is the new “buzzword” in the healthcare industry
- Role of advanced practice nurses to fill in the gaps as providers with the implementation of the Affordable Care Act
- Interdisciplinary team members to include advanced practice nurses, physician assistants, physical therapists, occupational therapists, dietitians, nutritionists, pharmacists, behavioral health professionals, health care administration professionals, HIT professionals, and informatics nurses
- Competencies created to support interdisciplinary teams within the HIT environment
- Educational standards to adequately prepare health care professionals to function within the HIT environment
- Support for the Nursing Education for Healthcare Informatics (NEHI) model as the gold standard for preparing nurses to function within the HIT environment
- Evidence for interdisciplinary teams supported by the Interprofessional Education Collaborative (IPEC®), the World Health Organization (WHO), the Institute of Medicine (IOM) and MIT
- Standards for the use of simulations in learning created
- National support for interdisciplinary teams
- Barriers for interdisciplinary teams to contribute to meaningful use

■ GLOSSARY TERMS

Advanced practice registered nurse (APRN): nurse educated beyond the bachelor’s degree level

Behavioral health professional: health care professional who serve as clinical and counseling psychologists, mental health and substance abuse social workers, mental health counselors, substance abuse counselors, psychiatrists, and marriage and family therapists

Certified nurse-midwife (CNM): have prescriptive authority and provide care to women during pregnancy and birth, as well as primary care health services to women from adolescence beyond menopause

Certified nurse practitioner (CNP): nurses who order, conduct, and interpret diagnostic and laboratory tests; prescribe both pharm/non-pharmacologic agents; establish and coordinate interprofessional plans of care; and teach and counsel on health promotion and risk reduction of disease

Clinical nurse specialist (CNS): prepared at the masters or doctoral level as expert clinicians in a specialized area of nursing practice

Certified registered nurse anesthetist (CRNA): are the primary anesthesia providers in rural America and other medically underserved areas; practice in a variety of settings

Computer-based provider order entry (CPOE): use of the computer to order medical tests

Dietitian: plans and conducts food service to assist in the promotion of health and control of disease

Education standards: documents that identify and direct inclusion of essential content within all nursing curricula

Health care administration professional: professional who plans, directs, and coordinates medical and health services

HIT professional: professional who focuses on health information technology

Informatics nurse specialist: the identification, definition, management, and communication of data, information, knowledge, and wisdom.

Institute of medicine (IOM) core competencies: behaviors that highlight interprofessional teamwork and reliance on technology solutions to enhance patient–clinician communications, planning, and decision making.

Interprofessional Education Collaborative (IPEC®): national education associations of schools of the health professions focused on creation of core competencies for interprofessional collaborative practice to guide curricula development at all health professions schools

Interprofessional team: group of healthcare professionals responsible for the provision of patient care

Meaningful use (MU): process implemented in a series of phases to demonstrate utilization of EHRs and the impact on health

National prevention strategy: reflects the U.S. goal for improving health care of the population and is reported to Congress each year

National quality strategy: aims and priorities to improve health care of the population

Nursing Education for Healthcare Informatics (NEHI): model of care designed to enhance advanced practice care delivery

Nutritionist: plans and conducts nutritional programs to assist in the promotion of health and control of disease

Occupational therapist: assesses, plans, organizes, and participates in rehabilitation programs that help build or restore vocational, homemaking, and daily living skills, as well as general independence, to persons with disabilities or developmental delays

Pharmacist: dispense drugs prescribed by physicians and other clinicians with prescriptive authority and have become important information resources for patients about medications and their use

Physical therapist: assesses, plans, organizes, and participates in rehabilitative programs that improve mobility, relieve pain, increase strength, and improve or correct disabling conditions resulting from disease or injury

Physician assistant: healthcare provider who works with a physician to provide patient care

Quality and Safety Education for Nurses (QSEN): a project that generated quality and safety competencies and accompanying educational materials for pre-licensure nursing students and the faculty teaching such content

Scope of practice: identifies behaviors and actions permissible based upon education and licensure

Simulation standards: standards designed to advance the science of simulation, share best practices, and provide evidence-based guidelines for implementation and training

Standards of practice: actions and behaviors expected to be performed when functioning within a particular nursing role

Technology Informatics Guiding Education Reform (TIGER): a grass roots collaborative effort that established specific recommendations for schools of nursing to prepare nursing students and practicing nurses to fully engage in digital health care

CHAPTER 3

Scientific and Theoretical Foundations for Driving Improvement

■ CHAPTER SUMMARY

This chapter focuses on the development and application of theory to nursing informatics. Epistemology is used to describe how knowledge is viewed and how alignment with epistemology influences opinions and ideas. Within this chapter science is defined as a body of knowledge including facts and theories generated by the use of controlled rigorous and precise methods within a delimited area of concern. From this the definition of theory or theoretical framework emerges which is explained as being an attempts to describe, explain, or predict some phenomenon of interest.

The stages of theory development include: 1) observation of some phenomenon; 2) proposed explanation of the phenomenon; 3) a model is developed outlining key concepts and their relationship to the phenomenon including processes and interaction of the concepts; and, 4) the model is tested and refined. At the conclusion of this process a theory emerges.

There are different levels of theories. Grand theories are broad in scope. The bulk of this chapter focuses on middle range or Mid-Range theories because this level of theories within nursing informatics has been used to aid in the development of objective empirical indicators like variables or constructs. Mid-Range theories are also identified as being useful to build understanding about processes and actions within phenomenon. Additionally Mid-Range theories help builds enlightenment about social processes involving humans and technology.

Nursing informatics have used other informatics-based theories for sources of knowledge, including information science, cognitive science, computer science, various information/knowledge attributes, and technology interface characteristics. The rest of the chapter uses a theoretical methodology not traditionally used in nursing informatics.

The interactive socio-technical analysis (ISTA) model addresses various types of social, technical, and contextual interactions with HIT that can result in unintended consequences. This analysis proposes five different interaction typologies that occur when new HIT is introduced into an established social system.

The study of quality improvement is also a part of this chapter. Here the authors explain how there is no one single accepted definition or value for quality but is a blend of different theorists and approaches. Even so it is strongly suggested that quality studies include the six core areas to include safety and patient-centeredness of care, effectiveness, timeliness, efficiency, and equitability of services. Since quality improvement can either be an approach or a tool, the Plan-Do-Study-Act model is included.

The authors introduce the Actor-Network Theory (ANT) to be the primary socio-technical lens of discussion for use within QI activities. ANT represents: actor, networks, translation. Another feature of ANT is that of a Black Box network, or a stabilized actor-network. When a Black Box network stabilized, all the actors within the network do not function as separate entities but rather the network functions as one.

The chapter ends after the analysis of two case examples:

■ KEY ITEMS

- Epistemology is the building block of science
- Science is a body of knowledge created by specific methods within a delimited area of concern
- Theories or theoretical frameworks describe, explain, or predict some phenomenon of interest
- Theories develop in specific stages
- Mid-Range theories in nursing informatics assist in the development of variables or constructs.
- The characteristics of enlightenment and narrative are included when discussing Mid-Range theories in nursing informatics
- An interactive socio-technical analysis (ISTA) can be used to analyze unintended consequences of HIT
- Quality improvement can be an approach or a tool
- The Plan-Do-Study-Act (PDSA) model is an approach to conceptualize quality improvement
- The Actor-Network Theory (ANT) can be used to operationalize quality improvement activities
- The Donabedian's framework identifies three overriding dimensions of health care evaluation: structure, process, and outcomes

■ GLOSSARY TERMS

Epistemology: the nature of knowledge and what we can actually understand and “know”

Science: a body of knowledge including facts and theories generated by the use of controlled rigorous and precise methods within a delimited area of concern

Theory: an attempt to describe, explain, or predict some phenomenon of interest; develops in stages

Socio-technical: refers to a system that contains both social and technical elements

Actor-Network Theory: process where an actor performs an action within a large network of actors who form, align, and stimulate action through a process called translation

Quality Improvement: a process that is preplanned, executed, and evaluated in a logical, stepwise fashion

Technology: the use of science to create a device to solve a problem

Plan-Do-Study-Act Model: an approach to conceptualize quality improvement

Donabedian Health Outcomes Model: framework to evaluate health care that includes structure, process, and outcome

CHAPTER 4

National Health Care Transformation and Information Technology

■ CHAPTER SUMMARY

This chapter explains the dynamic structure created, implemented, and supported to facilitate the implementation of electronic health information and health data sharing between health care entities. After a brief history of how slowly electronic health records were implemented from the 1970s to 2000s, the impact of the HITECH Act on health information technology after 2010 is explained.

The infrastructure to support electronic health information exchange has been successful however the goal has been to use the structure and not just build it. Therefore additional programs and plans were designed and implemented. These efforts include: creation of the Office of the National Coordinator for Health Information Technology (ONC); passage of the HITECH Act; funding of 6 major initiatives; supporting the EHR Incentive Program to define meaningful use (MU); creating the Regional Extension Center (REC) program; building health information exchange (HIE) capabilities in the states; implementing the Nationwide Health Information Network Direct (NwHIN Direct); supporting and creating Beacon communities; identifying Communities of Practice with the REC programs; identifying and supporting SHARP grants; and identifying workforce development programs within community colleges and universities along with the creation of a certification exam.

Although at first glance these programs and initiatives may appear to be free-standing they are actually interrelated and serve to support the entire goal of electronic health information and health data sharing between all health care entities. With the implementation of the Patient Protection and Affordable Care Act, two additional initiatives were created: National Quality Strategy and implementation of Accountable Care Organizations (ACOs). The National Quality Strategy focuses on aims and priority areas for quality and the ACOs focus is on payer reform.

■ KEY ITEMS

- HITECH Act supported the implementation of electronic health records and health care data sharing
- Office of the National Coordinator for Health Information Technology (ONC) was created to development standards within the health information technology
- The HITECH Act included funding provisions for six major initiatives
- Meaningful use defined from the EHR incentive program
- REC programs designed to get small practices to adopt and meaningfully use
- Health information exchanges (HIEs) built in each state
- Adoption of the Nationwide Health Information Network Direct (NwHIN Direct)
- Beacon programs implemented and communities identified which created learning/teaching guidelines

- Communities of practice created with REC areas
- Creation and implementation of web-based applications to be used as tools between and among communities of practice and REC areas
- Research and technology grants were awarded with specific goals
- Workforce development focused on community colleges, universities, and the creation of a certification exam
- HITECH Act intricately tied to the Patient Protection and Affordable Care Act through the National Quality Strategy and formation of Accountable Care Organizations

■ GLOSSARY TERMS

Accountable Care Organizations: providers or groups of providers agree to assume some level of risk with regard to the treatment of a large cohort of individuals

Beacon Project: provided grants to communities to help them connect the use of health information technology to improvements in community health outcomes as demonstrated by standardized quality measures

EHR Certification Program: created a national standard of functionalities that providers and hospitals could reference to ensure that their EHR was capable of supporting meaningful use

EHR Incentive Program: a five-year program of increasing complexity to encourage providers and hospitals to adopt and meaningfully use electronic health records

National Quality Strategy: identifies aims and priorities which are intended to serve as a framework for each of the different health-related agencies within the HHS

Regional Extension Center (REC) Program: a program to provide technical assistance to primary care providers in small and safety-net practices to facilitate selection, adoption, and use of electronic health records

State HIE Program: a program for States to build a nation-wide technological infrastructure that supports the secure exchange of clinical content between relevant care providers

Strategic Health IT Advanced Research Projects (SHARP): projects awarded to four university centers to spur technological innovation regarding the development of EHR technology

CHAPTER 5

Consumer Engagement/Activation Enhanced by Technology

■ CHAPTER SUMMARY

This chapter focuses on actions taken to improve Stage 2 of the HITECH Act for meaningful use—patient engagement. First a series of surveys were conducted which showed that communicating with patients about their health care decisions improved outcomes. In addition a systematic review of clinical trials where patients used evidence-based decision aids led to the following: 1) improved knowledge of options; 2) more accurate expectations of possible benefits and harms; 3) choices more consistent with informed values; and 4) greater participation in decision making.

Besides the HITECH Act Stage 2, additional national initiatives to support patient engagement include the National Quality Strategy and the National Prevention Strategy which identifies the steps needed to empower people. These steps are then provided as applicable to the health care environment. The Patient Protection and Affordable Care Act supports patient engagement by mitigating some of the waste related to failures of care delivery, failures of care coordination, and overtreatment. And Accountable Care Organizations (ACOs) are expected to provide coordinated, high-quality care to assigned beneficiaries while meeting quality metrics and financial targets.

The frameworks created by the federal government to support patient engagement are reviewed along with approaches to address basic needs and strategies improve health literacy. Additional strategies to support patient engagement include DNA analyses and health education web sites.

Information about the strengths of interprofessional teams is reviewed to include the importance of all disciplines being focused on the same goals for the patient while being aware of each discipline's specific role. The importance of patient engagement, or patient activation, cannot be overlooked. Three steps to ensure patient activation are provided.

The chapter includes examples of different models to assist with patient engagement, specifically the Family Health Model, the Betty Neuman Model of health, family systems theory, the Institute for Patient and Family Centered Care, and patient- and family-centered care. An example of competencies created for dietitians is provided which offers a list of interprofessional informatics competencies upon which health care professionals could potentially align.

Not to be forgotten, technology is available to aid with patient engagement. This includes the use of personal data devices and patient generated health information. Lastly an approach to provide high-quality care at low cost is reviewed. This approach, a learning health care system, has to meet four specific characteristics: science and informatics, patient–clinician partnerships, incentives, and culture.

■ KEY ITEMS

- Outcomes of patient engagement
- Types of national initiatives to support patient engagement
- Importance on the use of interprofessional teams to support patient engagement
- Specific models to support patient engagement
- Approaches to enhance patient activation
- Competencies to support informatics and patient engagement
- Use of technology to support patient engagement to include personal data devices and patient generated health information

■ GLOSSARY TERMS

Affordable Care Act: legislation to ensure health insurance coverage for the vast majority of U.S. citizens

HITECH Act: legislation for the use of electronic health information

Interprofessional education/collaborative: approach where professionals are all focused on the same goals for the patient and are acutely aware of each other's roles

Patient engagement: actions, processes, or strategies used to increase a patient's participation in health care decision making

Patient activation: another term for patient engagement; understanding that one must take charge of one's health and that actions determine health outcomes; a process of gaining skills, knowledge, and behaviors to manage health; and having confidence to make needed changes

CHAPTER 6

Computers in Health Care

■ CHAPTER SUMMARY

This chapter provides a crash course on computer terminology, hardware, software, and system designs. Computers have had a role in health care for many years with the primary role of communication. With computers the quality of communication will depend upon the quality of the system.

Health care informatics is an evolving science with the machine playing a very strong hand in the process of automated clinical decision support (ACDS). The design of the ACDS depends upon the map or the size and scope that are intended for communication. The reader is reminded however that ACDS are far from replacing expertise and intuition in health care decision making.

Basic computer terminology is reviewed to include bit, byte, hardware, and software. With hardware, it is essential to keep in mind human factors for ergonomics and the potential for infection from using keyboards. A case study on ergonomics with bar code scanning helps examine this issue.

Specific health care professionals should be involved when selecting the hardware. The end users' needs must be taken into consideration to ensure correct and consistent use of the system. The different programming languages and types of software are also reviewed.

A 12 step process is provided that is suggested to be completed prior to selecting an EHR. The Office of the National Coordinator (ONC) also has resources to help with the selection process.

The last section focuses on the network, connectivity, and configuration of the hardware. Networks include LAN, WAN, Ethernet, and Internet. Network typologies include tree, star, ring, and bus. There are advantages and disadvantages of each type.

Communication protocols include transmission control/Internet protocols (TCP/IP), file transfer protocol (FTP), and simple mail transfer protocol. These protocols have become the industry standard for interconnecting computer hosts, networks, and the Internet. Cloud computing is when a company provides their software on a server that can be accessed from the Internet. Client server architecture depends upon if the client is thin or thick – which refers to the number of applications running on a system.

The chapter ends after a brief review of key terminology regarding health information technology, specifically EHR, EMR, and PHR.

■ KEY ITEMS

- Health care informatics is evolving
- The design of any automated clinical decision support (ACDS) depends upon the map or the size and scope that are intended for communication
- Basic computer terminology includes bit, byte, hardware, software, transmission control/Internet protocols, file transfer protocols, simple mail transfer protocols

- A 12 step process should be completed before selecting an EHR
- Terminology to describe the use of computers in health care can vary and include EMR, EHR, and PHR

■ GLOSSARY TERMS

Application software: software that has a purpose or function specific for its use

Database: a type of application software

Ergonomics: the study of actions or activities on basic human body functioning

Hardware: items needed to run the computer

Hardware configuration: basic design of the computer parts

Human factors: characteristics of humans that need to be taken into consideration when selecting and using computer systems

Network typology: physical layout of the computers and networking; are usually in the shape of a tree, star, ring, or bus

Programming languages: a mechanism for coding information into a computer in the form of machine code, instructing the computer to do some type of task

Programming tools: used to compile programs and link computer codes that belong to either the system or application software

Query: a type of computer language

Software: application that is used or run on the computer

System software: software used to start and run a computer

Usability: focuses on how useful a computer system/software is for the intended person to use it

CHAPTER 7

Electronic Health Records and Point-of-Care Technology

■ CHAPTER SUMMARY

This chapter begins with a review of how slowly electronic health records had been implemented over the years. It took until the 2000s with the passage of the HITECH Act and meaningful use when the urgency for implementation became more evident.

The virtues of electronic health records (EHR) as impacting quality and safety are reviewed prior to beginning an explanation of the implementation and adoption process. However there are specific steps to be completed before advancing to the actual implementation phase.

First, a vendor needs to be identified. Then demos need to be conducted. Staff may view the use of the system in another organization. Then finally, the cost of the system can be discussed. But, this is just the beginning!

The implementation phase has several steps: initiation, analysis, design, implementation, and support and maintenance. Workflows need to be reviewed, analyzed, and updated. Policies and procedures need to be written. Education plans need to be designed. Schedules for training need to be determined. Super users need to be identified. There is a tremendous amount of activity involved in the implementation phase of the process.

However through this entire potential chaos one nurse stands, ready at the helm to guide the process and facilitate the implementation – the informatics nurse. This nurse understands the clinical processes and knows what needs to be done to support patient care and quality. This nurse has the ability to discuss information technology (IT) issues and can translate the clinical staff's needs in appropriate terms so that the user cases are appropriately built into the system.

This action-packed chapter is fascinating to read and even more fascinating to reflect on once participating in an actual implementation of an electronic health record. Specific areas to focus include the importance of an EHR to support quality and patient safety, the integral roles of the super user and informatics nurse, preparing for the inevitable downtimes, and the ability for the EHR to support point of care and legacy systems.

■ KEY ITEMS

- Electronic medical record implementation had a slow start but picked up in the 2000s after legislation and implementation of meaningful use
- Electronic medical records have a positive impact on safety and quality of patient care
- There are three approaches to making a decision about an electronic medical record vendor
- The process begins with an RFP or request for proposal
- Demos, live usage reviews, and the budget need to be taken into consideration before selection
- There are 5 phases to the implementation of an electronic medical record
- Workflows need to be analyzed to ensure that the system is build according to user needs

- The informatics nurse plays an integral role during every phase of the electronic medical record process
- Never underestimate the importance of super users
- There are four levels of adoption of the system
- Evaluation occurs in the form of surveys, questionnaires, focus groups and workflow analyses
- The system needs to support the organization's point-of-care functions such as medication administration and bedside laboratory testing
- The system selected needs to integrate with other systems currently being used or legacy systems
- Since an electronic system is never fully implemented, plans needs to be in place to manage ongoing change
- Downtime can and will occur and this needs to be planned for in advance

■ GLOSSARY TERMS

Adoption: willingness of a person or organization to adapt to the electronic technology

Barcode medication administration: digitalized interface used to facilitate the safe administration of patient medications at the bedside

Early adopters: individuals who embrace technology but search for bugs in the system

Electronic health record: record of a person's health information in a system that can be accessed by individuals between organizations

Evaluation: steps taken to determine the effectiveness of action

Implementation: action taken to change a process or behavior

Innovators: individuals who embrace technology

Interoperability: ability for one electronic system to communicate with another

Laggards: individuals who are resistant to the implementation of technology

Point-of-care technology: digitalized interface with data or actions performed at the patient's bedside

Roger's Diffusion of Innovation model: process to identify the ability for people to adopt and adapt to an electronic medical record

Super users: individuals who are highly adept at working with electronic communication tools

CHAPTER 8

Systems Development Life Cycle for Achieving Meaningful Use

■ CHAPTER SUMMARY

This chapter delves into the action steps required for successful implementation of an electronic health record. These steps are based upon the systems development life cycle (SDLC) approach which mirrors the nursing process.

The first phase, planning, is reviewed along with the necessary steps and processes. It is important to remember that the scope of the project must meet or exceed the end users' expectations. The importance of a project charter is reviewed along with the integral parts.

The analysis phase is completed next. During this phase the end-user requirements are identified. Tools to facilitate this phase include workflow analyses and data flow diagrams.

During the design phase the goal is to convert the functional and technical specifications into software applications in the form of programming code. Included in this phase is determining the computers, processors, and devices necessary for the system. Situational analysis, project management applications, and a Gantt chart are useful tools for this phase.

While working in the design phase ensuring that the requirements meet the ADA must be addressed. The needs of both end-users and patient must be taken into consideration. Also during this phase the design strategy is identified. Examples of strategies include waterfall method, rapid application development (RAD), agile techniques and object-oriented.

Prior to going live with the system rigorous testing must occur. Testing approaches include unit, system, integration, acceptance, alpha, and beta testing. System testing tools include automated test scripts and load and volume testing.

Although it seems that the phases thus far have been extremely labor intensive, the most time consuming phase of the project is to occur next – implementation. This is the go-live phase which can occur using a phased or incremental, big bang, or parallel systems approach. Education and training occur during this phase. A variety of methods such as elbow-to-elbow, training rooms, and super users are reviewed.

The role of the informatics nurse thus far has been one of management and support to the process. When the implementation phase occurs however the role explodes. The informatics nurse is the implementation manager, responsible for a myriad of actions and activities.

The final phase of the process is evaluation. Here the identified goals are examined for achievement. The chapter ends with a critical analysis of the process used by the U. S. government when implementing the expectation for electronic health records to prove meaningful use.

Although not specifically identified in this summary this chapter has a multitude of important and essential tables and graphs. It would be wise for the student to study these tables and graphs to gain an in-depth understanding of the complexity when implementing an electronic health record and to have a better understanding of the role of the informatics nurse during this process.

■ KEY ITEMS

- Action steps for the implementation of an electronic health record follow the systems development life cycle (SDLC) approach
- Planning is the first phase where the scope of the project is defined and the project charter completed
- During the analysis phase workflow analyses and data flow diagrams are prepared
- The design phase is intensive but facilitated by situational analysis, project management applications, and a Gantt chart
- ADA requirements and the design strategy is identified during the design phase
- Rigorous testing must occur before implementation
- The go-live phase, or implementation, is intense and can occur incrementally, as a big bang, or using a parallel systems approach
- Education occurs during the implementation phase and should be planned as close to going live as possible
- The role of the informatics nurse is paramount through the entire process
- Evaluation is the final step where goals are examined for achievement
- The government utilized a similar process when implementing the expectation for electronic health records to meet meaningful use
- The tables, graphs, and charts are important learning tools to study and examine

■ GLOSSARY TERMS

Agile: approach used that creates a feedback loop with the end users

Alpha testing: testing done using test data or “made-up” data

Assessment: step performed to determine the needs of the organization, staff, and patients when implementing an electronic system

Beta testing: testing done with a sample of “real” data

Big Bang implementation: all units or hospitals in a system go live at once

Command center: a 24-hour resource center on site for the first 3 days of each rollout

Commercial off-the-shelf products: system purchased as a final product

Core implementation team: team that is onsite the first 24 hours and available by cell or pager for 2 weeks thereafter the implementation

Cost benefit analysis: calculation of the cost of something and the potential return as a form of a benefit

Evaluation: actions to determine if the goals of the project were met

Implementation: actions performed when preparing for an electronic system to go live

Integration testing: tests how well the different components work together

Phased implementation: units or facilities within a health care system are incrementally brought up on the new system

Project management: actions taken to ensure successful implementation of the electronic system

Rapid application development: an approach used to speed up development

Request for information: document asking for information about a specific product

Return on investment: determination if the money invested on something has met or exceeded the return

Request for proposal: document asking a vendor to explain the steps and processes required if an electronic system is going to be implemented within an organization

Super user: person who is familiar with the clinical unit and has been trained as a trainer on the new system

Systems development life cycle: standardized approach to information technology development and implementation

System testing: testing done by the system analyst to make sure the system functions as the designer understood it to be developed

Unit testing: testing one specific component or module that performs a specific task

Waterfall: an approach to development that occurs as a cascade

Workflow Redesign in a Quality Improvement Modality

■ CHAPTER SUMMARY

This chapter begins with an introduction on the importance of using workflow redesign for quality improvement that involves mapping a process to identify areas for improvement or a needed change. Different types of workflow diagrams include: simple linear workflow, swim lane or cross functional, flowcharts, spaghetti diagram, value Stream Map, and SIPOC.

Since a major purpose of workflow redesign is to improve quality, a project charter should be developed which are to include twelve areas. From the charter the method to evaluate the outcome or change should be identified.

The steps to workflow redesign are provided to include: identify process to be mapped; identify and involve individuals who perform the tasks; map the current state; assess current state workflow; identify opportunities for improvement; identify data to measure redesign outcomes; map future “to be” process; test new workflows and processes; train on new workflows and processes; go live with the new workflows and processes; and analyze data and refine workflows and processes.

This process can be diagramed by using software which shows the workflow with different shapes and sizes. The steps to using desktop software for workflow design are provided. Templates are another method for creating for workflow designs and the steps for using templates is also provided.

The chapter ends after identifying workflows applicable to the ambulatory care and acute care settings which can assist with determining meaningful use with the electronic record.

With regards to issues with meaningful use this chapter identifies the issues that providers may have with advancing through the meaningful use stages because of issues with the electronic record. It is possible to improve meaningful use if time were taken to diagram previous and intended workflow designs.

■ KEY ITEMS

- Workflow redesign is a quality improvement approach
- There are a variety of designs for workflow diagrams
- The process begins with a project charter
- There are specific steps to be followed when redesigning a workflow
- There is software available to help with creating workflow diagrams
- Templates are available to assist with creating workflow diagrams
- There are different workflows applicable to different areas within the health care environment
- Workflow redesign can assist with achieving meaningful use

■ GLOSSARY TERMS

Barriers: something that gets in the way of accomplishing a goal or objective

Electronic health records: designed to contain and share information from all providers involved in a patient's care; data can be created, managed, and consulted by authorized providers and staff from across more than one health care organization

LEAN management: an approach to running an organization that supports the concept of continuous improvement, a long-term approach to work that systematically seeks to achieve small, incremental changes in processes in order to improve efficiency and quality

Meaningful use: providers showing that certified EHR technology is being used in ways that can be measured significantly in quality and in quantity

Project charter: a mechanism for defining what needs to be improved in a process and how improvements and key components will be measured after the redesign

Quality: a subjective attribute that is can be measured objectively through the use of specific tools; an approach to measuring outcomes of care

Regional Extension Centers: offers technical assistance, guidance, and information to support and accelerate health care providers' efforts to become meaningful users of Electronic Health Records (EHRs)

Workflow redesign: a fundamental technique used within quality improvement that involves mapping a process to identify areas for improvement or change needed

CHAPTER 10

Evaluation Methods and Strategies for Electronic Health Records

■ CHAPTER SUMMARY

This chapter focuses on the mechanisms to measure success, or evaluate the success of implementing an electronic medical record. Suggested approaches for evaluation include an overall program evaluation, paying particular attention to stakeholder engagement, patient engagement, and clinical engagement. Other evaluation approaches can be approached from the project description.

The evaluation design is essentially built into the system prior to implementation. The project charter or logic model can be used for this type of evaluation.

When evaluating the evidence gathered needs to be credible. End user satisfaction needs to be taken into consideration along with the return on investment. Any and all conclusions must be justified and if found unsuccessful the organization could consider rip and replace.

Another factor in the evaluation is ensuring the use of the system. Models for ensuring use include the HIMSS 7 level Electronic Medical Record Adoption Model (EMRAMSM) and the Davies award. Organizations can also consider sharing lessons learned through conferences and publications.

When measuring success, the organization should keep in mind if the data collected during the evaluation of the system is useful, feasible, ethical, and accurate. When determining or evaluating meaningful use, organizations need to reinforce safety and quality along with achieving the MU measures. The eight dimensions of EHR safety model are provided in addition to five components for safe EHR use.

■ KEY ITEMS

- Evaluation should be planned when establishing the project charter
- Areas to include when evaluating include stakeholder engagement, patient engagement, and clinical engagement
- Data to support the evaluation needs to be credible
- End user satisfaction is important
- Return on investment is important
- If the system has major flaws, rip and replace can be considered
- Consider evaluating the system according to a model for ensuring use
- Data collected for evaluation should be useful, feasible, ethical, and accurate

■ GLOSSARY TERMS

Balancing measures: a negative evaluative measurement

Davies Award: a model used to ensure use

EMRAM: a model used to ensure use

End user acceptance: action that indicates the end users are willing to use the electronic system as intended

Evaluation: method to measure success

Measures: criteria to evaluate success

Outcomes: criteria to determine if an action had an impact

Patient safety: one type of criteria used to evaluate the success of an electronic system

Return on investment: determination if the amount of time, money, and effort produced or contributed to a positive outcome

Satisfaction: positive experience with an electronic system

CHAPTER 11

Electronic Health Records and Health Information Exchanges Providing Value and Results for Patients, Providers, and Health Care Systems

■ CHAPTER SUMMARY

This chapter focuses on the importance of information exchange with electronic health records. It begins with a review of previous health information exchanges (HIEs), their use, value, and limits. Then a review of current HIEs is discussed.

The structure of an HIE can vary depending on whether data are managed in a centralized, decentralized, or hybrid manner. Figures providing a diagram of each of these structures are provided.

Information about technical exchanges is reviewed next. Two commonly used models are direct messaging and the query-based transactions. Direct Messaging provides a means for organizations to exchange secure data at the point of care at a reduced cost. This process uses platforms similar to secure e-mail that encrypt data and support a cryptographic validation process. It was initiated to help providers meet Stage 2 meaningful use (MU) requirements and to foster the development of the Nationwide Health Information Network (NW-HIN). Query-based exchange provides the community and providers with the ability to find information when they are delivering potentially unplanned care such as in an emergency department.

The Standards and Interoperability Framework is discussed next. This framework was developed to enable health care stakeholders to drive higher interoperability and greater health information exchange to improve quality of care. There are currently nine initiatives under this framework. Business models for HIE vary depending upon the value proposition and business use for the exchange.

Next information about a regional master patient index (MPI) and record locator system is provided. An MPI is needed to provide accurate identification of patients across care settings within an HIE. The purpose of an MPI is to identify unique patients within a delivery system maintaining disparate information systems or across institutions within regions.

Record linkage is the methodology of creating a single record from two or more records that belong to the same person and can occur in one of three ways: deterministic, rule-based, or probabilistic. Probabilistic methods are considered the most sophisticated and use complex mathematical models to weight the match probability. This method takes into account the uncertainty that can exist in comparing the values being used for comparison.

The value of EHRs and HIEs is becoming more evident to doctors, hospital systems, and patients. Studies have demonstrated that fewer repeat procedures are being conducted with reductions in medication errors. Diagnostic tests and follow-up visits are decreasing and there is a cost savings when EHRs are exchanged. Ready access to health information aids in the delivery of timely and appropriate care. The chapter includes a list of studies conducted that demonstrate increasing value of EHRs and HIEs.

The chapter ends with a case study intended to demonstrate trust with EHRs and HIEs.

■ KEY ITEMS

- Health information exchanges (HIEs) have been used for many years
- The structure of HIEs depends upon how the data is managed
- Two technical exchanges used are direct messaging and query-based
- There are nine initiatives under the Standards and Interoperability Framework
- Business models for HIE vary
- A master patient index (MPI) is used to accurately identify patients across care settings
- Record linkage creates one record from two or more than belongs to the same person
- Record linkages can occur in one of three ways
- The value of EHRs and HIEs is becoming more evident
- A case study is used to demonstrate trust with EHRs and HIEs

■ GLOSSARY TERMS

Health information exchange: a method to share health information about a patient between providers and care settings

Interoperability: the ability of one system to use parts of another system

CHAPTER 12

National Standards for Health Information Technology

■ CHAPTER SUMMARY

This chapter focuses on the importance of standards as a fundamental building block that the industry must address to fully realize the potential of the information technology (IT) infrastructure implemented under the Health Information Technology for Economic and Clinical Health (HITECH) Act.

Standards are essential for interoperability between systems. Since health information is being exchanged between systems, the systems must be able to communicate. Standards help with this communication.

Standards for the exchange of health information continue to evolve. Specific NwHIN-related standards can be grouped into three areas: 1) content structure specifications; 2) transport and security specifications; and 3) vocabulary and code set specifications. Additional standards introduced at this time include PHIN and PHRI.

The four basic methods for standard development are provided, specifically ad hoc, de facto, government-mandated, and consensus. Common data standards are reviewed to include functional specifications for EHRs, messaging, clinical document standards, medical imaging and communication, code Sets, vocabularies, and values, ICD and CPT code sets, LOINC and SNOMED-CT. Standards are crucial to meet the expectations of the HITECH Act and meaningful use.

Even with so many standards gaps still exist. Examples of gaps include the lack of data quality standards and advance directives.

Information about data mapping is provided along with types of map relationships that can exist. Additional considerations for mapping include the reasons for the project, or “the use case,” as well as who is expected to benefit and use the map.

The characteristics for controlled medical libraries is introduced and should include: content, concept orientation, concept permanence, non-semantic concept identifier, polyhierarchy, formal definitions, rejection of not elsewhere classified, recognized redundancy, multiple granularities, multiple consistent views, and graceful evolution.

The chapter ends with a review of national and international nursing standards.

■ KEY ITEMS

- Standards are fundamental building blocks
- Standards are essential for interoperability between systems
- Standards for the exchange of health information continue to evolve
- Specific NwHIN-related standards can be grouped into three areas
- There are four basic methods for standard development
- Standards are crucial to meet the expectations of the HITECH Act and meaningful use
- Gaps in standards still exist

- There are three types of map relationships
- There are specific characteristics for controlled medical libraries
- National and international nursing standards are being mapped for HIT

■ GLOSSARY TERMS

Ad hoc standards: those that are established by a group of stakeholders without a formal adoption process

Consensus standards: those that are developed through a formal process of comment and feedback by interested stakeholders

CPT Code Sets: classification system used for procedures

Data mapping: the process of linking interoperable components from one system to another and is an essential component for interoperability

De facto standards: evolved over time to become universally used without a government or other mandates

Equivalence: determined by the distribution of the map relationships for a given map

Government-mandated standards: specified or established by the government for certain purposes

Health care data standards: fundamental building blocks that the industry must address to fully realize the potential of the information technology (IT) infrastructure implemented under the HITECT Act

ICD Code Sets: classification systems for diseases

CHAPTER 13

Public Health Data to Support Healthy Communities in Health Assessment Planning

■ CHAPTER SUMMARY

This chapter focuses on the importance of conducting a community health assessment, needed to support the HIT goal of improving population health. The first step in this process is assessing the community.

A community health needs assessment (CHNA) determines a community's strengths and assets and helps identify what might be needed to improve the community's health. It is an evidence-based analysis of health-related strengths, weaknesses, opportunities, and threats (SWOT) for a specified community. A community assessment is an expectation as identified within the Affordable Care Act, Centers for Disease Control and Prevention (CDC) Voluntary Accreditation Program and the Medicaid waiver program.

The process to conduct a community assessment begins with a review of the literature followed by selection of an assessment tool. The tool should facilitate mapping of the community's strengths and assets. Upon completion of the assessment the data is next analyzed using four approaches: compile secondary data, inpatient utilization patterns, primary data collection, and new data sources. Specific population variables should be addressed to include population density, economics, birth and birth-related information, mortality and morbidity, and access to primary care.

Upon completion of the analysis a complete picture of a community's health can be determined. The data can be triangulated to show specific areas of strength and potential opportunities. From this information, interventions are planned and provided.

The final step is the evaluation of the assessment plan and interventions. Strategies are linked to indicators or outcome metrics. Effectiveness of the community health improvement plan (CHIP) is determined after evaluation and interpretation of the outcomes of data analysis by all stakeholders. Outcomes that fall short of the plan are analyzed and included in recommendations for future plans.

■ KEY ITEMS

- A community health assessment supports the HIT goal of improving population health
- A community health needs assessment (CHNA) determines a community's strengths and assets
- An assessment tool needs to be selected
- Data is analyzed after completing the assessment
- Interventions are planned based upon the analyzed data
- The plan is evaluated for achievement of indicators and outcomes
- The plan is revised based upon achievement of outcomes

■ GLOSSARY TERMS

Community health improvement plan (CHIP): process of realistic priority setting and long-range planning that includes action plans to achieve the goals and objectives of a plan

Community health needs assessment (CHNA): collecting and analyzing data to mobilize communities, empower citizens, engage stakeholders, set priorities, and identify resources to improve population health

Medicaid Waivers: methods that states use to determine if Medicaid needs to be expanded to meet the needs of a specific state

Population density: the total number of individuals living in a specific per square mile area

CHAPTER 14

Privacy and Security in a Ubiquitous Health Information Technology World

■ CHAPTER SUMMARY

The importance of maintaining the privacy and confidentiality of personal health information is paramount today, especially with the electronic transmittal of information. This chapter focuses on the security issues with digitalized data.

A variety of agencies and legislation have been created to protect electronic information: HIPAA, Federal Trade Administration (FTC) through the Unfair and Deceptive Trade Practices Act, Food and Drug Administration (FDA), and 42 CFR Part 2 enforced by the Substance Abuse and Mental Health Services Administration (SAMHSA), as well as state and international privacy laws. Regardless of these measures, breaches of confidential electronic information still occur.

HIPAA added new provisions within the security rules to ensure compliance with the HITECH Act expectations. These provisions focus on electronic submissions and code sets so that anyone transmitted confidential electronic information is doing so in compliance with the federal regulations.

The HIPAA security rule governs electronic personal health information and has safeguards that fall into three areas of compliance: 1) administrative, 2) physical, and 3) technical. The HIPAA Privacy Rule applies to all personal health information regardless of form. Updates have been made to the business associate agreements and additional changes to the HIPAA legislation to be in compliance with the HITECH Act include the creation of a breach notification rule and increased privacy protection for genetic information.

The continued and compounded creation, transmittal, and use of electronic information have heightened the need for cybersecurity strategies. The internet, interfaces with Smartphones, tablets, and Playbooks has contributed to this ever-growing threat for data breaches. Personal health information is at risk through every device and electronic avenue. The potential for cyberattacks will only grow in the future as technology and data storage approaches evolve and expand.

The role of the informatics nurse is essential in this digitalized era. Risk assessments need to be performed and analyzed. Action plans to address potential cybersecurity issues need to be created and addressed.

Besides being aware of the need to maintain the security and privacy of personal health information the nurse needs to maximize patients' trust in electronic systems. Privacy and security rules need to be followed; policies need to be written to thwart potential cyberattacks; and all staff needs to be educated on ways to ensure the security and privacy of all health information.

■ KEY ITEMS

- There are more security issues with digitalized data
- Agencies and legislation exists to protect electronic information
- Breaches of confidential electronic information still occur
- HIPAA added new provisions within the security rules to ensure compliance with the HITECH Act expectations
- The HIPAA security rule governs electronic personal health information
- Safeguards fall into three areas of compliance
- Personal health information is at risk through every device and electronic avenue
- The role of the informatics nurse is essential in this digitalized era
- The nurse needs to maximize patients' trust in electronic systems

■ GLOSSARY TERMS

Cloud: term used to describe a method of data storage

Covered entity: business expected to adhere to HIPAA privacy, security, and transaction laws

Cybersecurity: applications, systems, and processes to protect digitalized information

Health Insurance Portability and Accountability Act (HIPAA): the first health privacy legislation; protects personal health information through privacy laws, security laws, and transactions

PHI: personal health information

Privacy: one aspect of the HIPAA law that focuses on the protection of all personal health information

Security: one aspect of the HIPAA law that focuses on protection of electronic information

Social media: web sites created for the sharing and communication of personal information between subscribers

Texting: method of communication using a telephone to transmit a written message

Transactions: the electronic transmittal of personal health information for the purpose of billing or reimbursement

Trust: belief that information shared will be kept confidential

Ubiquitous computing: everywhere and anywhere/anytime computing that is enabled by significant underlying infrastructure

CHAPTER 15

Personal Health Records and Patient Portals

■ CHAPTER SUMMARY

This chapter focuses on the implementation of patient portals in order for providers to achieve Stage 2 of meaningful use. Specifically, to achieve Stage 2 providers are to provide 50% of all unique patients seen within a reporting period access within four business days of when the information is available to them and 5% of patients must download and/or transmit information via the portal.

A patient portal typically includes: 1) patient record/history from the provider's main HER; 2) educational/training documents; 3) collaboration methods such as e-mail during 24 hours a day, to communicate with health care professionals, and 4) quality metrics, such as outcome measures that demonstrate progress over time. Advantages for both patient and provider portal use are reviewed.

An issue with portal use and meaningful use is that every patient will not want to or can use the portal. Reasons for not using a portal include no internet access, no computer, age, and computer illiteracy. And since penalties might be imposed upon providers who are not adhering to Stage 2 of meaningful use, the patient portal issue is paramount.

In efforts to improve computer literacy the nation has designed an action plan with seven goals. In addition, the Agency for Health care Research and Quality published extensive guidelines for developers of materials and websites for the low literacy populations. This information is provided in the chapter. Providers can also access the National Learning Consortium computer materials action list for additional information.

Even though there is evidence to suggest that reduced communication between patient and provider leads to increase healthcare costs and needs, patients remain reluctant to use the portal. Actions to increase patient participation include urging patients to prepare a question list before seeing a provider and inputting information as patient-generated health information.

The chapter ends with suggestions to help increase portal use to include portraying a positive attitude about the portal, increasing staff enthusiasm about the portal, having all interprofessional team members encouraging the portal use and addressing computer literacy level, education level, satisfaction with portal use, the enrollment process, internet access, time frame for adoption, readability of materials, severity of patient illness, and knowledge of portal use trends.

■ KEY ITEMS

- Implementation of patient portals are needed for providers to achieve Stage 2 of meaningful use There are advantages for both patient and provider for the use of a portal
- There are specific issues for patients to not use a portal

- Action plans, guidelines, and computer material action lists are available to help with patient portal use
- There are actions that increase a patient's participation in a portal

■ GLOSSARY TERMS

Computer literacy: ability to use a computer

Patient-generated health data (PGHD): health-related data created, recorded, or gathered by or from patients address a health concern

Patient portal: secure online website that gives patients convenient 24-hour access to personal health information from anywhere with an Internet connection

CHAPTER 16

Telehealth and Mobile Health

■ CHAPTER SUMMARY

Telecommunication is changing the way patients receive care and addresses individuals who have previously been unable to receive care because of distance or cost. Telehealth includes telemedicine, remote management/monitoring/coaching and mobile Health.

Telemedicine, which can mean “healing at a distance,” has been around for decades. Even though various definitions have been written about telemedicine, the elements of this care delivery approach remain the same: provide clinical support, overcome geographical barriers, use various types of ICT, and improve health outcomes. Telemedicine in general has gained AMA and federal support

Telemedicine applications are either store-and-forward, or asynchronous, or real time, or synchronous. These approaches can be applied to a wide array of services in diverse settings. Telemedicine in nursing, or telenursing, has been growing as a separate field within the industry. So much so that there is decision support tools that support the nursing process for telenursing.

Another aspect of telehealth is remote monitoring. Remote patient monitoring (RPM) refers to a wide variety of technologies designed to manage and monitor a range of health conditions. Point-of-care monitoring devices are examples of RPMs. Telephone interaction accompany RPM.

Issues regarding licensure have surfaced with the use of telehealth. A major question is what is considered the site of service? Is it the patient’s home or the nurse’s state of residence? Because of this issue the Nurse Licensure Compact was born.

Telehealth helps reduce the cost of medical care. Studies have shown reduced hospitalizations for patients with heart failure. And the industry is just going to keep growing in the years ahead.

The final aspect of telehealth is mobile health or mHealth. This is the accumulation of health information through a mobile device. The use of personal health apps (applications) on mobile devices is growing which raises issues about security and privacy of personal health information.

There is a need for medical liability coverage in telehealth, specifically to address equipment hardware, equipment-user-transmission interface, and backup systems. In regards to HIPAA, patient confidentiality and HIPAA requirements apply to telehealth nursing. Privacy policies and informed patient consent remain the same for telehealth encounters as for in-person care.

■ KEY ITEMS

- Telecommunication is changing the way patients receive care
- Telehealth includes telemedicine, remote management/monitoring/coaching and mobile Health.

- Telemedicine has been around for decades
- Telemedicine in general has gained AMA and federal support
- Telemedicine applications are either store-and-forward, or asynchronous, or real time, or synchronous
- Telenursing has been growing as a separate field within the industry
- Remote patient monitoring (RPM) refers to a wide variety of technologies
- Issues regarding licensure have surfaced with the use of telehealth
- Telehealth helps reduce the cost of medical care
- mHealth is the accumulation of health information through a mobile device
- There is a need for medical liability coverage in telehealth
- Patient confidentiality and HIPAA requirements apply to telehealth nursing
- Privacy policies and informed patient consent are the same for telehealth encounters

■ GLOSSARY

BYOD: bring your own device

mHealth: generation, aggregation, and dissemination of health information via mobile and wireless devices

Real time, or synchronous: individuals are simultaneously present for immediate exchange of information

Remote patient monitoring (RPM): variety of technologies designed to manage and monitor health conditions

Store-and-forward, or asynchronous: exchange of prerecorded data between two or more individuals at different times

Telehealth: methods of digital care delivery that are “away” from the patient

Telemedicine: healing at a distance

Telephone triage: a process between the nurse and the client that occurs over the telephone and involves identifying the nature and urgency of client health care needs

Strategic Thinking in Design and Deployment of Enterprise Data, Reporting, and Analytics

■ CHAPTER SUMMARY

This chapter provides information on how a healthcare delivery organization (HDO) develops meaningful data, reporting, and analytics to support the strategic plan. Overall, businesses fall into one of three groups when it comes to analytics: analytic innovators, analytic practitioners, or analytic challenged. HDOs fall into the analytically challenged category.

To improve this status the E-DRAP process is proposed. This process is designed to help HDOs with their analytics by integrating the people, processes, and technologies associated with the effort.

There are three areas to consider with technology: 1) identify key data architecture foundational components that are essential to launch and/or accelerate an HDO's reporting and analytics journey; 2) discuss importance of and options for sharing developed BI content within online BI libraries with end users; and 3) review alternatives for evaluating and selecting the optimum technology(s) among the myriad of vendor options presented to HDOs.

For people, HDOs must be founded on a strong corporate culture of making data and analytics a core asset and source of competitive differentiation. Organizations need strong leadership while aligning analytics to the HDOs strategy and goals. A culture of data transparency is a central core feature for all stakeholders, to meet their clinical, quality, operational, and financial goals. Additional features for the category of people include a governance council and a business-led program management.

There are three main components within the process category: 1) roadmap, 2) continuous and iterative process cycles designed to assess readiness, design, document, and build BI reporting and analytics, and release and train end users; and 3) support best practice methodologies to be employed throughout the continuous and iterative process cycles.

This chapter ends after a discussion of best practices for HDOs to maintain quality analytics. Best practices provided in this chapter include Agile, Lean Six Sigma VOC, and a Use-Based Data Quality Model.

■ KEY ITEMS

- Healthcare delivery organizations (HDOs) need meaningful data to support the strategic plan
Businesses fall into one of three groups when it comes to analytics
- The E-DRAP process integrates people, processes, and technologies
- There are three areas to consider with technology
- Organizations need strong leadership while aligning analytics to the HDOs strategy and goals
- There are three main components within the process category
- There are best practices for HDOs to maintain quality analytics

■ GLOSSARY

Agile: an IT practice that promotes continual, iterative, and rapid cycle releases to realize a quicker return on information investment to quickly meet end-user needs

Analytic challenged: barely use data beyond basic reporting applications

Analytical innovators: data and analytics and considered a core asset that permeates the organizational culture

Analytic practitioners: utilize data and analytics to address tactical and operational issues

Business intelligence (BI): continually evolving, online collection of subject matter, reporting, and analytics that is readily available and shareable to end users in a central location that is convenient within their reporting and analytics workflow

Enterprise Data Management, Reporting, and Analytics Program (E-DRAP): integrates clinical, financial, operational, and third-party data sources for reporting, analytics, and research

Roadmap: identifies work streams of project work for people, processes, and technology

Voice of the customer (VOC): a Lean Six Sigma process that is used to capture the customers' requirements to inform the reporting and analytics solutions development

CHAPTER 18

Data Management and Analytics: The Foundations for Improvement

■ CHAPTER SUMMARY

It is not only important to have a mechanism to collect data, the healthcare delivery organization (HDO) needs to do something with it. That is the purpose of this chapter: analyzing the data.

First the three types of data are reviewed (clinical, operational, and financial) and then the basics of data analysis are discussed. Analysis starts with a theory and then proceeds to the level of measurement. Steps to operationalize measures are provided along with actions to ensure the quality of the data.

Data transformation includes changing text data to numerical values and data mapping. Statistical analysis occurs next and includes determining the right statistical test to analyze the data. This section ends after learning the value of control charts.

The final section of this chapter focuses on analytics and business intelligence tools. These include software packages, spreadsheets, BI tools and data mining.

■ KEY ITEMS

- There are three types of data
- There are four levels of measurement
- Operationalizing depends upon the dependent and independent variables, confounder factors, and outcome and process measures
- The quality of the data will affect the analysis
- Mind mapping and workflow mapping helps conceptualize data
- Data mapping is an analysis technique
- A variety of statistical tests can be used when analyzing data
- Control charts are useful tools
- There are a variety of software packages, spreadsheets, and business intelligence tools to help with data analysis

■ GLOSSARY

Confounding factors: situations or factors that influence the outcome of interest that must be controlled when examining the impact of an intervention on some outcome of interest

Control chart: represents a picture of a process over time

Database: a large collection of data organized for rapid search and retrieval

Data mapping: matching between a source and a target that contain the same data elements but called by different names

Data mart: a subsection of the data warehouse that stores data for a very specific intended purpose

Data warehouse: a retrospective store of data setup to report trends, offer comparisons, and provide strategic analysis; includes clinical, operational, and financial data

Dependent variable: outcome of interest

Independent variable: a variable that is related to the dependent variable of interest, or it may be an intervention that is manipulated in a research study or improvement process

Mind map: a visual depiction of some phenomenon of interest

Normal distribution: a theoretical distribution or “bell shaped curve” where the mean, median, and mode converge in the center of the curve

Variable: a conceptual data element used for independent or dependent variables within a study with a quantity that may assume any of a set of values

CHAPTER 19

Clinical Decision Support Systems

■ CHAPTER SUMMARY

This chapter focuses on Clinical Decision Support Systems (CDSs), their use within an electronic health record, and the impact they have on stage 2 of meaningful use. First the CDS is defined as a tool constructed within the electronic health record (EHR) that triggers alerts that encourage the health care team to do the right thing at the right time with correct interventions within the clinical workflow.

CDSs are tools. They do not replace clinical decision-making or expertise. They make clinical decisions easier or clearer by offering evidence-based choices determined by practice standards, regulatory compliance elements, current literature, and other determinants.

Strategies for implementing a CDS are reviewed next. The first step is to ensure that the CDS is aligned with the mission, vision, and values of the organization. Other strategies include having the right stakeholders and leaders involved in the entire process, using documentation wisely, and plan for testing, evaluation, and follow-up after implementation. Other strategies include ensuring a quality implementation team and planning to follow the 10 commandments and 5 rights for successful CDS implementation.

Next different types and CDS tools are reviewed along with some information about the Arden syntax. Other information provided includes actions to ensure that the CDS is in alignment with quality improvement activities, the need for a CDS oversight committee, implementing the CDS, educating staff, altering workflows, and evaluating the success.

CDS programs are an integral part of meaningful use and information about this is also provided in the chapter. An example of how CDS supports population health is provided.

Challenges with CDSs include timing, speed, and access to alerts. The most significant issue is the autonomy desired by clinicians related to how much control end users have over responses to the CDS. Actions to address CDS challenges are also provided. The chapter ends after reviewing potential legal implications when using a CDS.

■ KEY ITEMS

- CDS is a tool constructed within the electronic health record (EHR) that triggers alerts that encourage the health care team to do the right thing at the right time with correct interventions within the clinical workflow
- CDSs do not replace clinical decision-making or expertise
- CDSs make clinical decisions easier or clearer
- The CDS needs to be aligned with the mission, vision, and values of the organization
- There are 10 commandments and 5 rights for successful CDS implementation
- CDS programs are an integral part of meaningful use
- Challenges with CDSs include timing, speed, and access to alerts
- Clinicians are concerned about the amount of autonomy over a CDS

- There are actions to address CDS challenges
- There are potential legal issues with using a CDS

■ GLOSSARY

Arden syntax: language used when building a CDS that provides the timing of triggers and other clinical information

Clinical decision support system: a tool constructed within the electronic health record (EHR) that triggers alerts encouraging the health care team to do the right thing at the right time with correct interventions within the clinical workflow

CHAPTER 20

Health Information Technology and Implications for Patient Safety

■ CHAPTER SUMMARY

This powerful chapter focuses on the importance of patient safety when implementing HIT. After explaining the impetus behind the Patient Safety Act specific safety issues with HIT are reviewed.

Then different models of unintended consequences are provided to include unintended adverse consequences, operational model for three domains of expertise, Harrison's Interactive Sociotechnical Analysis (ISTA) Model, the hazard model by the Agency for Healthcare Research and Quality, and the emergency care research institute annual report of errors.

Next the clinical impact of unintended HIT errors is reviewed. Examples of clinical impact include data noise, missing the patient story, errors with patient identification, alert fatigue, and EHR-induced medical errors.

The next section focuses on what to do when a patient safety issue occurs. The priority is to collect data and document. A variety of areas for documentation are provided within the chapter content.

Then actions to mitigate HIT patient safety issues are reviewed. This includes reviewing the actions in the publication "Health Information Technology Patient Safety Action & Surveillance Plan," following the SAFER guide, establishing a "no-blame" culture, using the Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) model, consulting the Leapfrog group CPOE tool, and transforming nursing leadership and education.

When remediating unintended consequences the reader is urged to pinpoint the cause, and prioritize, plan, and execute the remediation. An example of nursing's approach to remediation in Texas is provided.

■ KEY ITEMS

- It is important to focus on patient safety when implementing HIT
- There are models of unintended consequence
- Unintended HIT errors affect clinical care
- There are actions to take when a patient safety issue occurs
- There are specific strategies to mitigate HIT patient safety issues
- Remediating unintended consequences includes pinpointing the cause, prioritizing, planning, and executing remediation

■ **GLOSSARY**

Patient safety organizations (PSOs): organizations created for health care organizations to share information on patient safety events without the fear that the information might be used against them in a lawsuit

Unintended consequences: unplanned, unexpected, and potentially harmful results when HIT is implemented

CHAPTER 21

Quality Improvement Strategies and Essential Tools

■ CHAPTER SUMMARY

This chapter serves as a good review of quality improvement initiatives and tools. Before any quality improvement action is taken there needs to be a strategic initiative to report and address patient safety and quality.

The first process discussed is Plan-So-Study-Act (PSDA). An example of using this type of process is for work redesign. Then the basic types of tools are reviewed to include flowcharts, check sheets, histograms, Pareto charts, cause-and-effect diagrams, scatter plots, run charts and control charts.

Additional processes reviewed include Six Sigma, Lean, and control charts. The chapter ends with two cases to demonstrate the use of these tools and processes with HIT quality and safety issues.

■ KEY ITEMS

- A strategic initiative needs to be in place before taking quality improvement action
- Quality improvement processes include Plan-Do-Study-Act, Six Sigma, Lean, and control charts
- Quality improvement tools include flowcharts, check sheets, histograms, Pareto charts, cause-and-effect diagrams, scatter plots, run charts and control charts

■ GLOSSARY

Cause-and-effect diagrams: a tool for visually identifying the underlying cause or the potential etiology for the issue of examining relationships

Check sheets: a mechanism to enter data under predetermined categories aimed at clarifying and collecting data objectively

Control chart: a line graph with separate types of charts depending on the level of measurement for continuous or discrete data

Flowcharts: diagrams that map workflows and processes to identify areas for improvement

Histograms: a graphic representation of data dividing the data in the chart in categories or groups divided into equal widths with height representing the quantity (count or percentage)

Lean: a collection of techniques for reducing waste in a process

Pareto charts: used to identify patterns and trends looking for the most significant categories

PSDA cycle: an approach to improve an area of concern that affects quality or safety

Run chart: a line graph is used to depict a trend or change over time

Scatter plots: used to examine relationships in graphical form on x- and y-axis between variables of interest examining the dots and the patterns that arise from the scatter of the dots.

Six Sigma: a method to measure various processes that emphasize quality control, zero defects, and low cost

CHAPTER 22

National Prevention Strategy, Population Health, and Health Information Technology

■ CHAPTER SUMMARY

This chapter begins by explaining the importance of using quality metrics for population management. Then population health issues are discussed in terms of the National Prevention Strategy and the four strategic directions. Additional national directives for population health have been established by Healthy People, community assessment surveys, and accountable care organizations (ACOs).

But before population health determination can occur, the data must be assessed for the ability to provide actionable results. A logic model is used at this time which has the main components of: 1) identifying input, output, processes for intervention, and evaluation outcomes; 2) assessment of the targeted population health-data that supports the logic model; 3) analysis of data quality; 4) approach for data quality improvement; and 5) generation of measures based on the logic model. Types of data include survey, administrative, electronic health records, and reporting systems.

Although there is no one way to define quality, for this chapter the Donabedian framework of structure–process–outcome is used. Then the settings and availability of the data need to be determined. This would include inpatient and output data, clinic or physician offices, other health care settings, or patient-provided data.

Then metrics need to be developed. This is done by identifying the need, the populations affected, the settings, the availability of the data and the burden, accountability and transparency. The metrics should provide information about individuals, populations, and providers. The data should also be adjusted for risk to account for differences in the population.

The chapter ends by providing a list of different sources of existing quality metrics.

■ KEY ITEMS

- Quality metrics are needed for population management
- Directives for population management are available through the National Prevention Strategy, Healthy People, community assessment surveys, and accountable care organizations (ACOs)
- The logic model has 5 main components
- Types of data include survey, administrative, electronic health records, and reporting systems
- The Donabedian framework is used to define quality
- Data can be collected from a variety of settings
- Metrics are created by identifying the need, the populations affected, the settings, the availability of the data and the burden, accountability and transparency
- Metrics should provide information about individuals, populations, and providers
- Data should be adjusted for risk

■ GLOSSARY

National Prevention Strategy: guides in the most effective and achievable means for improving health and well-being

Outcomes: either desired or undesired results relating to improved health for the patient

Population health: health outcomes of a group of individuals, including the distribution of such outcomes within the group

Process: execution of structural knowledge, procedures, and best practices that are accompanied by skills to perform the required tasks

Risk: attributes or behaviors that increase or decrease the likelihood of disease

Risk adjustment: a statistical tool that accounts for confounding circumstances or factors

Structure: the presence of facilities or materials necessary to perform health care tasks

CHAPTER 23

Developing Competencies in Nursing for an Electronic Age of Health Care

■ CHAPTER SUMMARY

This chapter focuses on the need and challenges faced when attempting to develop competencies for the electronic environment. Schools, regulatory agencies, and organizations all agree that competencies are needed however the issue meets several challenges.

Informatics competencies have been used in some instances however objective methods to determine competency in simulated settings are lacking. This is in conjunction with the absence of fully operational electronic health records in the simulation setting.

The advantages and outcomes of simulation-based learning are reviewed. This approach to learning promotes: 1) clinical judgment, 2) skills acquisition and retention, 3) interprofessional teamwork, and 4) has a positive impact on patient outcomes. Using simulation-based learning for electronic health record mastery has been studied however outcomes are improved if the software closely mimics the software used in the clinical setting.

Additional information in this chapter includes an explanation of the HEALTH model to fully realize the benefits of HIT for improvements in health and quality of care and the Quality and Safety Education in Nursing model.

The chapter ends by providing methods to fully implement electronic health records into simulation centers.

■ KEY ITEMS

- There are specific challenges with developing competencies for electronic systems
- Regulatory agencies, accrediting bodies, and schools of nursing all agree that competencies are needed
- Studies have been done to determine the best approaches to learn the use of electronic systems
- Traditional training does not fully prepare the student to feel confident documenting on an electronic system in the clinical setting
- Simulation-based learning helps facilitate competency with electronic systems
- The HEALTH model focuses on health improvement and quality
- The Quality and Safety Education in Nursing model has six competencies and three levels that address quality and safety

■ GLOSSARY

Competency: having the knowledge, skills and ability to practice safely and effectively

Simulation-based learning: environment where learners actively participate in dynamic experiences that mimic situations that are anticipated in the future

CHAPTER 24

Genomics and Implications for Health Information Technology

■ CHAPTER SUMMARY

This chapter discusses the impact of genomics on electronic health records currently and going forward. After a brief introduction the reader is provided with a history of genomic science. From this we then are provided with information as to how this science supports personalized medicine.

Patient involvement in genomics has been increasing particularly with the development and availability of genetic testing through home data collection devices and companies promoting genetic testing capabilities at “reasonable” costs. The regulation of these testing approaches is under FDA scrutiny. Genetic testing through this avenue can increase health care costs and create privacy issues.

There needs to be a place to store all of this genetic data. Computers and storage devices have to be expanded or created to protect the data while offer easy access if necessary. The increase in genomics will affect stage 4 of meaningful use.

Biorepository issues are another challenge. Questions regarding ownership of information, sharing with family, and use of information for ongoing research remain to be answered. Even so, there are recommendations for genomic information to be incorporated into electronic health records which will then affect decision support systems.

The impact of genomics on the future of newborn screening (NBS) programs remains to be seen. Additional genetic research may enhance NBS or render them obsolete.

Many genetic resources have been developed and a table of these resources is provided. The issue with these resources is that they are information dense, requiring the user to have a working knowledge of genomics and associated research.

Lastly genomics has created a new set of ethical issues which will impact the integration of this information into electronic health records.

■ KEY ITEMS

- Impact of genomics on electronic health records
- Ways genomics personalizes medicine
- Increased patient involvement in genetic testing
- Impact of increased genetic testing
- Issues regarding storage of data, availability of use, and potential use in research
- Effect of genetic testing on newborn screening
- Resources on genomics are available
- Ethical issues exist regarding genomics and electronic health records

■ GLOSSARY

Genetic Information Nondiscrimination Act: created to remove barriers to the appropriate use of genetic services by the public, while protecting individuals from misuse of genetic information in health insurance and employment

Genome: an individual's genetic code

Genome wide association studies: examine the associations between gene alterations and common diseases.

Genomics: the study of genes and their functions and related techniques

Genomic science: relationship and interactions between genes, environment, and behaviors

HapMap Project: describes each gene variant, where each variant is located and how variants are distributed across and within different populations

Whole genome sequencing: map of a person's entire genetic makeup

CHAPTER 25

Nanotechnology and Implications for Health Care Interprofessional Teams

■ CHAPTER SUMMARY

This chapter focuses on the fascinating science of nanotechnology and the implications with health information technology. After defining terms and providing a brief history of the science, applications for this technology to health care are provided to include lab on a chip (LOC), medication delivery applications, and diagnostic, monitoring, and treatment devices. The implications of this science on genomic research are explained next.

This brief but entertaining chapter ends after reviewing the implications of nanotechnology on patients and patient care, clinicians, nursing informatics, and safety considerations between nanotechnology and nanomedicine.

■ KEY ITEMS

- Nanotechnology will impact the health care industry
- Currently being used in drug delivery, laboratory medicine, and biotechnology
- Nanotechnology and genomics will have an ongoing relationship
- Nanotechnology impacts the consumer, clinician, and nursing informatics
- There are specific safety considerations with nanotechnology

■ GLOSSARY

Lab on a chip: a quick diagnostic laboratory test performed using nanotechnology to measure microfluidic immunoassays

Nanoinformatics: term used to encompass aspects of data collection, tools, and sharing, along with associated applications that are becoming a key element of nanotechnology research, nanotechnology environmental health and safety, product development, and sustainable manufacturing

Nanomedicine: highly specific medical intervention at the molecular scale for curing disease or repairing damaged tissues, such as bone, muscle, or nerve

Nanotechnology: the research and development of materials, devices, and systems designed to function at very small micro-levels and that exhibit physical, chemical, or biological properties

Nanotoxicology: addresses potentially toxic reactions to nanomaterials

CHAPTER 26

“Big Data” and Advanced Analytics

■ CHAPTER SUMMARY

This chapter focuses on the creation and maintenance of Big Data which is defined in terms of the 3 Vs or volume, velocity, and variety. Big Data has outgrown conventional storage facilities and contain vast amounts of unstructured data. Health care data fits into this description of Big Data.

The five use cases where Big Data is used in other industries is reviewed along with the applicability of these cases to health care. Even so, health care creates a phenomenal amount of data, all of which needs to be managed, protected, and utilized to improve patient outcomes and control costs. Legislation from the HITECH Act created more big data in the industry which compounds the challenges with data management.

Data mining is reviewed next along with phases, techniques, and tools. Then the role of the data scientist is explained. Software available to assist with data mining is described prior to an example of using big data for cancer research.

This chapter ends after an analysis of the role of the advanced practice nurse with big data.

■ KEY ITEMS

- Big data is defined in terms of volume, velocity, and variety
- Big data has outgrown storage facilities
- Health care creates a phenomenal amount of big data
- Data mining extracts meaningful information from data
- Informatics nurse is in the ideal position to be a data scientist
- Data mining is supported with tools and software applications
- Software applications assist with decision support
- Effective data mining impacts cost, patient satisfaction, and care outcomes
- Big data will only continue to grow because of the EHRs

■ GLOSSARY

Big Data: data that has outgrown conventional storage facilities; described by volume, variety, and veracity

Data mining: method in computer science that is used to discover patterns and trends within large data sets

Data scientist: advanced analytics professional who is capable of managing and analyzing massive amounts of data and using techniques and tools to extract meaningful data

CHAPTER 27

Social Media: Ongoing Evolution in Health Care Delivery

■ CHAPTER SUMMARY

No text on informatics would be complete without a chapter that focuses on the social aspects of informatics or social media. This definition of social media for this text is the interaction among individuals where they share, exchange, or create information and ideas across telecommunication and social networks.

The use of social media has changed the healthcare behavior of patients. Patients are empowered to seek out information and share findings with others. Social media has created new tools for learning, professional growth; facilitate learning about patients' health and provided opportunities for professional interventions.

A review of components that are standard over most social media sites is provided. These components help connect media to health outcomes. Avenues for this to occur include blogs, social networks, bookmarking tools, sharing content, microblogging, event management, geolocation services and live-streaming.

The informatics nurse needs to be cognizant of ways to mitigate risk with social media: professional filters should be applied; types of risk should be reviewed; becoming aware of changing boundaries between and amount professional and personal lives; and the importance of having an organizational policy that reflects current social media usage.

Social media has changed the way people communicate which impacts health informatics. It also impacts interprofessional communication and education.

■ KEY ITEMS

- Definitions of social media vary
- Social media has changed the healthcare behavior of patients
- Social media has created new tools for learning
- There are standard components to most social media sites
- Informatics nurses need to be aware of risks when using social media
- Organizations need policies to reflect current behavior and use of social media
- Social media has changed the way people communicate
- Social media impacts health information
- Social media impacts interprofessional communication and education

■ GLOSSARY

Bookmarking tool: applications that facilitate knowledge management of web pages by allowing users to organize and share resources with others

Build connections: friending, following, connecting, and linking

Social media: the interaction among individuals where they share, exchange, or create information and ideas across telecommunication and social networks

Commenting: leaving messages in response to others' conversations

Content management: allows users to publish and organize information

Content sharing: allows users to upload content in various media formats

Event management: an approach that enables users to collaborate on event planning and organization, as well as on promotion and event ticketing

Geolocation services: focus on the location of users, enabling users to save location and associate content with a specific context

Live-streaming: creates a platform for broadcasting live video or audio content over the Internet

Microblogging: is a platform for sharing short amounts of text content and weblinks

Professional filters: actions for professionals to consider when sharing content over the internet

Profile: avenue for a service to recognize and associate information and content with a specific individual

Social network: emphasizes connections and relationships of users and can focus on personal, professional, or specific interests

CHAPTER 28

Electronic Clinical Quality Measures: Building an Infrastructure for Success

■ CHAPTER SUMMARY

This chapter focuses on the steps needed to implement quality measures within the electronic health record. After providing information about an eMeasure, the importance of eCQM to measure meaningful use is reviewed.

Criteria for building an eCQM program, essential elements, individual involvement, and goals are then reviewed. At all times the eCQM program needs to be in alignment with CDSs being used. Additional information provided includes validating data, measuring for ongoing success, and guarding against unintended consequences.

This chapter ends after reporting mechanisms are reviewed next along with the importance of appropriate stakeholders, tools, and resources available for the measurement's life cycle.

■ KEY ITEMS

- Implementation of an eCQM program is the next phase of meaningful use
- The process begins with identification and alignment of eMeasures
- All stakeholders should participate in the entire eCQM process
- There are a variety of resources and tools to facilitate this process

■ GLOSSARY

Electronic clinical quality measures: quality measures built into the electronic health record

Health quality measure: a part of the architecture for an eMeasure

Measures application partnership: a public-private partnership convened by the NQF to provide recommendations to the HHS on the selection of performance measures for public reporting and performance-based payment programs

Technical Authority for the Unified Clinical Quality Improvement Framework: organization that coordinates eMeasures

Value set: detailed vocabulary underneath the measure that comprises the details of how to define the measure

CHAPTER 29

Interprofessional Application of Health Information Technology in Education

■ CHAPTER SUMMARY

This final chapter explores various exemplars of health care delivery from an interprofessional education/collaboration (IPE/C) approach. An interesting history of IPE is provided including a chronology identifying the actions taken in the development of IPE thus far.

The impact of ethics on IPE is discussed along with the four competency domains of IPE, specifically competency domain 1 which addressed values/ethics for interprofessional practice. A graphic is provided that demonstrates the relationship between the four main competencies of the IPE model and the work of the IPE team.

The relationship between IPE and HIT is reviewed next, focusing on the stakeholders. The chapter and the text conclude with a review of organizations and projects that have successfully implemented IPE.

■ KEY ITEMS

- IPE has been slowly developing over the years
- The US is actively involved in promoting IPE
- Ethics is closely related to the functioning of IPE
- A variety of stakeholders need to be taken into consideration with IPE
- Projects and initiatives have been implementing IPE

■ GLOSSARY

Interprofessional education: is when students from two or more professions in health and social sciences engage in professional training with the objective of developing collaborative practice to provide patient care

Interprofessional practice: occurs when two or more professions work together as a team with a common purpose, demonstrate commitment and mutual respect