

ONC Curriculum Version 2 – Component Summary

Component 1 - Introduction to Health Care and Public Health in the U.S.

A survey of how health care and public health are organized and services delivered in the U.S. Covers public policy, relevant organizations and their interrelationships, professional roles, legal and regulatory issues, and payment systems. Must also address health reform initiatives in the U.S.

Component Objectives

- Describe the medical model of healthcare in the US
- Describe the administrative and functional organization of entities that deliver healthcare in the US, both in the inpatient as well as the outpatient setting
- Discuss the role of various healthcare professionals, their education, and certification/licensure requirements
- Distinguish between public and private funding for healthcare
- Describe health care financing structures, including insurance plans, third-party payers, Medicare, and Medicaid
- Describe the organization and structures of HMOs, PPOs, and IPAs
- Describe methods of billing and reimbursement in healthcare
- Describe elements of coding and charge capture in healthcare
- Compare and contrast the function of the Joint Commission, FDA, CDC, and NIH, with an emphasis on EHRs
- Discuss legal issues in medicine including HIPAA, confidentiality, medical malpractice, and tort reform
- Describe the organization of public health in the US at the federal, state, and local levels, and discuss the role of public health in averting epidemics and bioterrorism
- Describe evidence-based medicine, clinical practice guidelines, and quality indicators in medicine. Identify key organizations involved in developing clinical guidelines.
- Discuss the key issues driving health care reform in the U.S.

Unit 1.1: Introduction and History of Modern Healthcare in the US

Introductory unit with description of definitions of terms used in the component, and an emphasis of paradigm shifts in health care, including the transition from patient-centric to physician-centric care, the transition from individual care to interdisciplinary team-based care, and the central role of technology in healthcare delivery. This unit will also emphasize the core values in US healthcare.

Unit 1.2: Delivering Healthcare Part I

Depiction of the medical model of healthcare in the US, with an overview of the organization of healthcare and the physical structure of healthcare delivery in the inpatient and long term care settings, with an overview of the organization of the VA system. This unit is intended primarily for the student who does not have a background in healthcare, though the constituents of this unit will be described at a relatively advanced level.

Unit 1.3: Delivering Healthcare Part II

Depiction of the medical model of healthcare in the US, with an overview of the organization of healthcare and the physical structure of healthcare delivery in the outpatient setting, and with an overview of the people involved in the delivery of healthcare, their education and licensing. This unit is

ONC Curriculum Version 2 – Component Summary

intended primarily for the student who does not have a background in healthcare, though the constituents of this unit will be described at a relatively advanced level.

Unit 1.4: Financing Healthcare Part I

Overview of health care financing, including healthcare insurance at the organizational and consumer levels. This unit will also include a brief discussion of the cost of healthcare services, managed care, and concepts of coding and billing for services.

Unit 1.5: Financing Healthcare Part II

This unit will discuss the cost of healthcare services, managed care, and concepts of coding and billing for services.

Unit 1.6: Regulating Healthcare

Overview of regulation of health care, including regulatory and professional organizations. This unit also discusses the regulation of safety in medicine, and details key legal aspects of medicine.

Unit 1.7: Public Health Part I

Overview of public health, with a brief history of public health in the US, description and definitions of terms in public health, public health roles, and the organization of public health systems in the US.

Unit 1.8: Public Health Part II

Overview of public health, with an emphasis on chronic and communicable diseases. This unit also discusses the role of public health in averting epidemics and bioterrorism.

Unit 1.9: The Evolution and Reform of Healthcare in the US

Overview of healthcare trends including evidence based medicine, quality and practice-care recommendations, comparative effectiveness research, and an overview of health care reform initiatives in the US.

ONC Curriculum Version 2 – Component Summary

Component 2 - The Culture of Health Care

A survey of how health care and public health are organized and services delivered in the U.S. Covers public policy, relevant organizations and their interrelationships, professional roles, legal and regulatory issues, and payment systems. Must also address health reform initiatives in the U.S.

Component Objectives

- Describe the major types of clinical personnel involved in health care, including their education and training, certification and licensure, and typical roles in healthcare.
- Describe the major types of settings in which health care occurs including ambulatory care, acute and emergency care, hospital based and critical care, and community health and public health settings.
- Describe the major processes of information gathering, analysis, and documentation used by clinicians to detect, understand, and prevent or treat diseases.
- Give examples and explain the differences between common forms of care delivery including episodic one-on-one care, multidisciplinary care, interdisciplinary care, care of chronic conditions, population based care, disease management, long-term care, and end of life care.
- Describe the role of community health and public health in managing illness outbreaks, epidemics, and pandemics
- Discuss the role of medical ethics and professional values in care delivery including such issues as privacy, confidentiality, ethical conflicts, and health disparities.
- Describe common forms of quality measurement, performance improvement, and incentive payment schemes meant to influence care delivery.

Unit 2.1: An Overview of the Culture of Healthcare

This unit is an overview of component. In this unit we will discuss some of the underlying concepts of health, culture, and health informatics applications.

Unit 2.2: Health Professionals—The People in Health Care

This unit takes a look at the health professionals who deliver healthcare and the training needed to work in these professions. The following professionals are described in this unit: physicians, nurses, advanced practice nurses, physician assistants, pharmacists, therapists, allied health professionals (x-ray techs, lab techs, etc.), paramedics, EMTs, dental professionals, mental health professionals, and social workers.

Unit 2.3: Health Care Settings- The Places Where Care is Delivered

This unit describes health care delivery sites including outpatient care, hospitals, tertiary care centers, academic medical centers, the VA healthcare system, the military health system, the Indian health service, and non-traditional delivery sites such as school-based, community-based, and employer-based sites.

Unit 2.4: Health Care Processes and Decision Making

This unit describes the process used by a physician to make a diagnosis and determine a care plan. This includes gathering information from the patient as well as other objective and subjective sources, managing and organizing the information, comparing the information to know states of disease, and how a clinician develops a care plan for the patient.

ONC Curriculum Version 2 – Component Summary

Unit 2.5: Evidence-Based Practice

This unit describes the concept of evidence-based medicine. The discussion breaks down evidence-based medicine into its smaller components and also a system for determining the quality of the evidence. Lastly, the discussion turns to using evidence based medicine and its limitations.

Unit 2.6: Nursing Care Processes

This unit describes the processes used by a nurse to perform an assessment and incorporate these observations into the patient’s care plan. This includes gathering information from the patient as well as other objective and subjective sources, managing and organizing the information, and charting the information so that all practitioners can be apprised of the patient’s condition and what care the patient has received.

Unit 2.7: Quality Measurement, Performance Improvement, and Incentive Payment Schemes

This unit describes the concepts of quality measurement, performance improvement, and incentive payments. These concepts are discussed in relation to the role of JCAHO and Medicare.

Unit 2.8: Professional Values; Medical Ethics; Privacy, Confidentiality, and Security

This unit describes the traditions and values in physicians, nurses, and allied health professionals. This unit also discusses privacy, confidentiality, and security of medical information, including the HIPPA Privacy and Security Rules. Medical ethics is discussed. Health care disparities, the rationing of care, and conscientious objection are also discussed in this unit.

Unit 2.9: Sociotechnical Aspects: Clinicians and Technology

This unit discusses the interaction and interdependence of social and technical resistance to change—especially among physicians. This unit also looks at the challenges of adapting work processes to new technology and why adapting paper process to technology will not work. The resulting impact on quality, efficiency, and safety is also discussed.

ONC Curriculum Version 2 – Component Summary

Component 3 - Terminology in Health Care and Public Health Settings

This component explains specific terminology used by workers in health care and public health. This is NOT a course in data representation or standards.

Component Objectives:

- Define, understand and correctly pronounce medical terms related to each of the major body systems.
- Define commonly used terms in public health, nursing, health information technology, and clinical vocabularies & terminologies related to the implementation of electronic health records.
- Identify the purpose and uses of pertinent health care terminologies in the electronic health record.
- Demonstrate the ability to integrate and use health care terminology in the various health information technology roles

Unit 3.1 Understanding Medical Words

Unit 3.2 Integumentary System

Unit 3.3 Musculoskeletal System

Unit 3.4 Blood, Lymphatic and Immune Systems

Unit 3.5 Cardiovascular System

Unit 3.6 Digestive System

Unit 3.7 Endocrine System

Unit 3.8 Ears, Nose, Throat, Eyes and Vision

Unit 3.9 Nervous System

Unit 3.10 Reproductive Systems

Unit 3.11 Respiratory System

Unit 3.12 Urinary System

Unit 3.13 What is Public Health?

Unit 3.14 What is Health Information Management and Technology?

Unit 3.15 Overview/Introduction to the EHR

Unit 3.16 Definitions and Concepts in the EHR

Unit 3.17 Clinical Vocabularies

ONC Curriculum Version 2 – Component Summary

Component 4 - Introduction to Health Care and Public Health in the U.S.

For students without an IT background, provides a basic overview of computer architecture; data organization, representation and structure; structure of programming languages; networking and data communication. Includes basic terminology of computing.

Component Objectives:

- Use proper hardware, network, Internet and software computer terminology in written and verbal communications.
- Write simple computer programs including constructs such as conditional statements, loops, functions, objects, simple data structures, etc.
- Design a simple database and develop querying statements for it.
- Describe network computing, its benefits and risks, and identify commonly-used communications hardware and software components.
- Identify security risks for computing systems and discuss potential solutions.
- Explain the design and development process of a large system such as an EHR.

Unit 4.1: Basic Computing Concepts Including History

This Unit will discuss the history of basic computing concepts and the ways that computers input, manipulate, calculate, and output data. It will provide information on selecting a computer by discussing the range of computer types, from desktops to laptops to servers. It will also discuss computer hardware and software and other electronic devices that contain computers.

Unit 4.2: Internet and World Wide Web

This Unit will cover the implications, origins, and use of the Internet and the World Wide Web. It will also discuss the advantages and disadvantages of this technology.

Unit 4.3: Computer Hardware and Architecture

This Unit will provide a foundation on how a computer functions and how data is represented in memory as a key element in understanding the field of information and computer science. Various input and output devices will be discussed, including how these devices connect to the computer, and the CPU and its role in making the whole computer system function.

Unit 4.4: Application and System Software

This Unit will cover application and system software including definitions and the elements that comprise them with a focus on healthcare systems. It will also describe the functions of file organization, different operating systems and the purpose and usage of file systems.

Unit 4.5: Overview of Programming Languages Including Basic Programming Concepts

This Unit will discuss the purpose and types of programming languages from simple machine code to high level programming languages, including the process of compiling and interpreting. Students will use variables, loops and conditional statements to build a simple program.

ONC Curriculum Version 2 – Component Summary

Unit 4.6: Databases and SQL

This Unit will discuss the purposes of databases, a relational database, and the querying language SQL. Students will design a simple database using data modeling and normalization. Basic data operations will be defined, common query statements will be created, and SQL implementation will be discussed.

Unit 4.7: Networks and Networking

This Unit will discuss the history and evolution of computer networks, including the various types of network communications. Various forms of networking addressing will be covered, as will network topologies, standards and protocols, and logical model concepts. Network hardware and wireless communication will also be addressed.

Unit 4.8: Security

This Unit will describe common security concerns and safeguards, including firewalls, encryption, virus protection software and patterns, programming for security. Security of wireless networks will also be addressed. Concerns and regulations relating to healthcare applications will be covered as well as safeguards in those platforms.

Unit 4.9: Components and development of large scale systems

This Unit will discuss large scale systems that support multiple, simultaneous users who access the core functionality through some kind of network. The components and development of these systems will be covered through the Systems Development Lifecycle, or SDLC, including the financial support of these systems over time.

Unit 4.10: Future of Computing

This Unit will cover five topics: trends in computing, interfaces used to communicate with computer systems, cloud computing, the changing social implications of the use of computer systems, and the ubiquity of computers in our daily lives.

ONC Curriculum Version 2 – Component Summary

Component 5 - History of Health Information Technology in the US

This component traces the development of IT systems in health care and public health, beginning with the experiments of the 1950s and 1960s and culminating in the HITECH act, including the introduction of the concept of “meaningful use” of electronic health records.

Component Objectives:

- Explain the rationale for elements of the HITECH Act in terms of the history of health IT(HIT) in the US.
- Describe the background of today’s health IT landscape including Electronic Health Records (EHRs), Health Information Exchange (HIE), Clinical Decision Support (CDS), and telemedicine, Public Health Informatics, Nursing Informatics, and the role of health IT in health care quality and safety.
- Describe the history of certification and regulation of health IT in the US.
- Describe how legislation related to privacy and security of electronic health information has evolved in the US.
- Discuss how financial incentives for use of health IT have changed over time
- Describe the background of the professional organizations that are involved with health IT.

Unit 5.1 Evolution of Health IT: The Early Years

Unit 5.2 Evolution of Health IT: The Modern Era

Unit 5.3 Evolution of Health IT: The HITECH Act

Unit 5.4 Evolution of Public Health Informatics

Unit 5.5 Evolution of Nursing Informatics and HIT Tools Used By Nursing

Unit 5.6 History of Electronic Health Records (EHRs)

Unit 5.7 History of Clinical Decision Support Systems

Unit 5.8 History of CPOE and E-Prescribing

Unit 5.9 History of Health Information Exchange

Unit 5.10 History of Privacy and Security Legislation

Unit 5.11 Software Certification and Regulation

Unit 5.12 History of Mobile Computing

Unit 5.13 History of Telemedicine

Unit 5.14 History of Quality Improvement and Patient Safety

This Unit describes the history of the use of information technology as a part of quality improvement and patient safety.

Unit 5.15 Payment-Related Issues and the Role of HIT

Unit 5.16 History of Health IT Organizations

ONC Curriculum Version 2 – Component Summary

Component 6 - Health Management Information Systems

A “theory” component, specific to health care and public health applications. Introduction to health IT standards, health-related data structures, software applications; enterprise architecture in health care and public health organizations.

Component Objectives

- Describe general functions, purposes and benefits of health information systems in various health care settings.
- Describe the federal initiatives and other significant developments that have influenced the evolution and adoption of health information systems.
- Compare/Contrast different types of health information systems in terms of their ability to meet the needs of various types of health care enterprises.
- Explain how electronic health records affect patient safety, quality care, efficiency, productivity, and reporting/documentation mechanisms.
- Propose strategies to minimize major barriers to the adoption of electronic health records.
- Explain how the principles of health care data exchange and health care data standards relate to patient care, productivity and data analysis.
- Outline the hardware, software, operating system and networking considerations necessary for effective data storage and use in health care organizations.

Unit 6-1 What is Health Informatics?:

Unit 6-1 defines information management, information technology, and informatics, describes the fundamental theorem of informatics, explains the meaning of biomedical and health informatics as a field of study, offers definitions of the major biomedical informatics areas of applications, and provides an overview of informatics drivers and trends. In addition, this unit defines the informatics team, their skills, roles and responsibilities, and identifies how health informaticians process data into information and knowledge for health care tasks with the support of information technology to improve patient care.

Unit 6-2 Hardware and Software Supporting Health Information Systems

Unit 6-2 explains the major hardware and software components used in computer systems, describes the types of network configurations, defines an information system and its characteristics, identifies the types of information systems that support the health care enterprise requirements, and summarizes the technologies that support health care information systems. In addition, this unit lists some challenges with the use of emerging information technology trends and discusses the advantages and disadvantages of the Internet as a platform for health care applications.

Unit 6-3 Electronic Health Records

Unit 6-3 defines an electronic medical record (EMR) and electronic health record (EHR) and explains their similarities and differences, identifies the attributes and functions of an EHR, discusses the issues surrounding EHR adoption and implementation, and describes the impact of EHRs on patient care. In addition, this unit links EHRs to the Health Information Exchange (HIE) and the Nationwide Health Information Network (NHIN) initiatives, discusses how HIE and NHIN impact health care delivery and the practice of health care providers, summarizes the governmental efforts related to EHR systems including meaningful use of interoperable health information technology and a qualified EHR,

ONC Curriculum Version 2 – Component Summary

describes the Institute of Medicine's vision of a health care system and its possible impact on health management information systems, and lists examples of the effects of developments in bioinformatics on health information systems.

Unit 6-4 Computerized Provider Order Entry (CPOE)

Unit 6-4 defines CPOE, states the purpose of CPOE, lists attributes and functions of CPOE, and explain how CPOE is currently being used in health care. In addition, this unit describes the major value to adopting CPOE applications, identifies the common barriers to adoption, and summarizes the potential impact CPOE has on patient care safety, quality and efficiency, and patient outcomes.

Unit 6-5 Clinical Decision Support Systems

Unit 6-5 defines clinical decision support systems, provides some historical context surrounding these systems, describes the requirements of a clinical decision support system, and discusses the relationship of clinical practice guidelines and evidence-based practice to clinical decision support systems. In addition, this unit identifies challenges and barriers in building and using clinical decision support systems, explains how legal and regulatory considerations may affect their use, and introduces the future directions for clinical decision support systems.

Unit 6-6 Patient Monitoring Systems:

Unit 6-6 defines patient monitoring systems, describes the purpose, attributes, and functions of patient monitoring systems, discusses the primary applications and how automation can improve quality of care, and analyzes how the integration of data from many sources assists in medical decision making. In addition, this unit discusses how Telehealth supports clinical care, explains the effectiveness and economic benefit of Telehealth, and examines the role of smart technology in the home and links to health information systems.

Unit 6-7 Medical Imaging Systems:

Unit 6-7 defines medical imaging, describes the purpose, processes, and management issues of medical imaging systems, analyzes the economic and technological factors that must be considered in the adoption of digital displays in radiology departments, looks at the major challenges with imaging systems faced by health care institutions and informaticians, and examines factors that will influence the future direction of imaging systems.

Unit 6-8 Consumer Health Informatics

Unit 6-8 identifies how the Internet has impacted consumer health informatics, explains how current and emerging technologies may affect consumer health informatics, and introduces the role of genomics in consumer health informatics. In addition, this unit defines PHRs, describes the role of PHRs and their implications within health care, and discusses the challenges of consumerism in health information systems.

Unit 6-9 Administrative, Billing and Financial Systems:

Unit 6-9 examines the relationship of administrative, billing, and financial systems to the health care information system, explores health care organizations' integration strategies, identifies the critical requirements for integration of these systems with clinical information systems, and explains how automation tools need to be and are being integrated in health care information systems. In addition,

ONC Curriculum Version 2 – Component Summary

this unit defines a master patient index or MPI and describes its core elements, reviews the current trends in establishing a national patient identifier, and discusses data analysis and trending.

ONC Curriculum Version 2 – Component Summary

Component 7 - Working with Health IT Systems

A laboratory component. Students will work with simulated systems or real systems with simulated data. As they play the role of practitioners using these systems, they will learn what is happening “under the hood.” They will experience threats to security and appreciate the need for standards, high levels of usability, and how errors can occur. Materials must support hands-on experience in computer labs and on-site in health organizations.

Component Objectives

- Identify common components of an HIT system and types of HIT applications (E-Mar, POE, PACS, ADT, Lab, DSS, Registries, Billing/Coding, etc, and acute care, community health, public health, small provider practices, etc.)
- Describe data flows across HIT systems and implication of standards.
- Identify root causes of HIT-induced error (i.e. usability, workflow interference, system error, etc.) and suggest solutions.
- Assess the strengths and weaknesses of identified solutions to identified HIT problems (to emphasize the reality of “solutions” and illustrate the frequent domino effect/unintended consequences of change of an HIT system)
- Defines usability, describes general usability principles, and relates usability to adoption in relation to HIT.
- Define and differentiate security, confidentiality, and privacy and identify common threats.
- Demonstrate beginning level competency in general HIT system use

Unit 7.1 Introduction & Overview: Components of HIT Systems

Unit 1 is an introductory unit where the core definitions and concepts of systems in general and healthcare specifically are presented. Using hands on exploratory lab exercises, students will be introduced to an example HIT system where they will learn basic navigation and gain familiarity with components common to many clinical HIT systems. Specific examples of HIT systems from a variety of settings will be discussed.

Unit 7.2 Under the Hood: Functions of HIT Systems

Unit 2 is designed to introduce students to the generic functions of HIT systems that underpin inpatient and outpatient (ambulatory) processes. Crafted HIT lab exercises will lead the student through a complete patient encounter – both inpatient and outpatient – to highlight how HIT systems support, and sometimes thwart, information flow.

Unit 7.3 Understanding Information Exchange in HIT Systems

Unit 3 will focus upon the functional aspects of interoperability within and between systems. Applying didactically presented concepts to hands on lab assignments, students will be challenged to locate and collate data from disparate systems, to respond to user requests for reports, and to assist users in planning for enhanced information flow in HIT systems.

Unit 7.4 The Effective HIT System

Unit 4 is designed to emphasize the aspects of HIT that contribute to effectiveness and meaningful use. The concepts of usability, consistency, and reliability in regards to HIT systems and how each contributes to, or detracts from, effectiveness will be presented. Definitions of evidence-based practice

ONC Curriculum Version 2 – Component Summary

and guideline-enhanced care will be covered in addition to how HIT can support effective, safe, and efficient patient-centered care.

Unit 7.5 Fundamentals of Usability in HIT Systems – What Does It Matter?

Unit 5 will present the basic concepts of usability in general and HIT usability specifically. Students will be exposed to usability bottlenecks and learn to identify usability roadblocks in the EHRS lab system, hypothesizing potential downstream effects of poor usability, and suggesting solutions/alternate designs. This unit will detail the relationships between usability, user satisfaction, and workarounds.

Unit 7.6 HIT Facilitated Error – Cause and Effect

Unit 6 is a unit that will focus upon error in health and healthcare that can be facilitated and propagated by HIT. Different classes of HIT errors (slips/mistakes, omission/commission) will be discussed and differentiated. Specific scenarios that create opportunities for HIT facilitated error will be presented to students in the lab exercises. In these exercises, students will apply concepts learned in the didactic portion of this unit to identify error, classify error, analyze root cause, and propose solutions.

Unit 7.7 Protecting Privacy, Security, and Confidentiality in HIT Systems

Unit 7 is designed to present an overview of the concepts of privacy, security, and confidentiality of protected health information (PHI) in relation to HIT systems. Threats to PHI frequently encountered in HIT environments such as password sharing, offsite access to EHRS, challenges of staff turn-over and student access, unauthorized access, etc. will be detailed. Students will be exposed to simulated breeches of privacy, security and confidentiality of PHI in lab exercises, asked to identify, and propose strategies to thwart.

Unit 7.8 HIT system planning, acquisition, installation, and training: Practices to Support & Pitfalls to Avoid

Unit 8 is a unit where the core definitions and concepts of HIT systems planning, acquisition, installation and training are presented. A variety of different settings will be used as examples in the unit, including small office practices, community clinics, acute care facilities and skilled nursing facilities. Students will conduct simulated user needs analysis, and using the lab EHRS, will identify gaps in meeting those needs. Students will develop training plans for a variety of settings.

Unit 7.9 Potential Issues with Adoption and Installation of an HIT system

The basics of human behavior, change, and adaptation will be discussed. Strategies for dealing with barriers to implementation (human and structural) will be covered.

Unit 7.10 HIT and Aspects of Patient-Centered Care

Patient-centered care will be defined and explained. The aspects of HIT that support (and detract) from patient-centered care will be discussed. Specific examples will be provided. Students will explore aspects of HIT that currently support patient-centered care and will propose new methods for enhancing patient-centered care.

ONC Curriculum Version 2 – Component Summary

Unit 7.11 Health IT in the Future

This unit will focus upon future directions for HIT. New areas of research and development in HIT will be examined. Students will gain a foundational understanding of these areas and will debate appropriateness and feasibility of new HIT development areas.

ONC Curriculum Version 2 – Component Summary

Component 8 - Installation and Maintenance of Health IT Systems

Instruction in installation and maintenance of health IT systems, including testing prior to implementation. Introduction to principles underlying system configuration. Hands-on experiences in computer labs and on-site in health organizations.

Component Objectives:

- Articulate the elements of Health IT systems, including their advantages and disadvantages.
- Justify criteria to be considered when recommending vendors and software
- Design a comprehensive plan to install a health IT system
- Design a comprehensive plan to maintain and troubleshoot a health IT system, incorporating system updates and user feedback
- Implement project plans by installing and configuring hardware and software, interacting with vendors and users as needed
- Verify plan implementation

Unit 8.1 (Elements of a Typical Electronic Health Record System):

Topics in this unit include: hardware, network, software and storage requirements needed to access EHRs

Unit 8.2 (System Selection – Software and Certification):

Topics in this unit include: the differences in COTS (Commercial Off-the-Shelf) and in-house/homegrown systems and how to select the system to meet the needs of the end users

Unit 8.3 (System Selection - Functional and Technical Requirements):

This Unit explores aspects of functional requirements of systems (by users) and technical requirements (by the system), including how to determine, document, prioritize, and act on those requirements.

Unit 8.4 (Structured Systems Analysis and Design):

This Unit includes: how to create a full project plan to incorporate all elements of design, implementation, data migration and conversion

Unit 8.5 (SDLC (Software Development Life Cycle) Model):

This Unit teaches the SDLC model and explores its application to well-known software and its utility for healthcare IT systems.

Unit 8.6 (System Security Procedures and Standards):

Topics in this unit include: Federal, state, and local health information regulations for EHRs, computer and network system vulnerabilities and best practices for identification and mitigation of those vulnerabilities, information access and protection measures, and user security training.

Unit 8.7 (System Interfaces and Integration):

This Unit explores the issues and challenges involved in interfacing and integrating systems, including understanding system requirements and the messaging and other techniques used between various systems.

ONC Curriculum Version 2 – Component Summary

Unit 8.8 (Troubleshooting, Maintenance and Upgrades, and Interaction with Vendors, Developers, and Users):

This Unit explores aspects of troubleshooting the system, including developing robust procedures, measuring system performance, and communication with vendors (or local developers).

Unit 8.9 (Creating Fault Tolerant Systems, Backups, and Decommissioning):

Topics in this unit include: Creating and maintaining redundant and fault-tolerant systems, implementing performance and reliability, backup, restore, and decommissioning

Unit 8.10 (Developing a Testing Strategy and Test Plan):

This Unit explores aspects of testing the system, including the use of performance baselines and the role of test plans.

Unit 8.11 (Pilot Testing and Full-Scale Deployment):

This Unit explores aspects of deploying the system to end users, including communication, technical support, user feedback, and system resource evaluation including initial pilot testing to obtain feedback before full deployment, including planning, identifying the user group, setting up the system, and gathering feedback.

ONC Curriculum Version 2 – Component Summary

Component 9 - Networking and Health Information Exchange

In-depth analysis of data mobility including the hardware infrastructure (wires, wireless, and devices supporting them) , the ISO stack, standards, Internet protocols, federations and grids, the NHIN and other nationwide approaches.

Component Objectives:

- Explain the OSI representation of the various layers involved in networking, including the general functions of each layer and their interconnections
- Explain the concept of the Application layer
- Explain the concept of the Presentation layer
- Explain the concept of the Session Layer
- Explain the concept of the Transport layer
- Explain the concept of the Network layer
- Explain the concept of the Data Link layer
- Explain the concept of the Physical layer
- Explain connection-oriented versus connectionless communication
- Explain the use of network addressing including security considerations and vulnerabilities

Unit 9.1 (ISO Open Systems Interconnection (OSI)):

This unit will address the OSI, including the purpose and content of each of its seven layers: physical, data link, network, transport, session, presentation, and application. Products, processes, protocols and tools at each level will be explained. This unit will also focus on the flow of data through the models as data is transmitted and receive by end devices.

Unit 9.2 (Network media and hardware communication devices):

This unit is designed to help the student understand network media, hardware devices, and how to select appropriate items to meet the guidelines for usage.

Unit 9.3 (National and International Standards Developing Organizations):

This unit introduces students to the national and international organizations that create standards used in networking and health information exchange

Unit 9.4 (Basic health data standards):

This unit provides an orientation to the important data-related standards that enable interoperable health data interchange

Unit 9.5 (EHR Functional Model Standards):

This unit explores the functional requirements and standards for electronic health records (EHRs).

Unit 9.6 (Health data interchange standards):

This unit emphasizes the importance of adhering to health data interchange these standards in order to ensure compatibility between systems.

Unit 9.7 (Supporting standards for EHR applications):

ONC Curriculum Version 2 – Component Summary

This unit presents a set of standards that support the application layer of the OSI and extend EHR functionality

Unit 9.8 (Enterprise Architecture Models):

This unit addresses different enterprise architecture models that provide an infrastructure for healthcare networks.

Unit 9.9 (Privacy, confidentiality, and security issues and standards):

This unit explores issues related to creating an environment in which to transport data in a secure manner that ensures privacy and confidentiality.

ONC Curriculum Version 2 – Component Summary

Component 10 - Fundamentals of Health Workflow Process Analysis & Redesign

Fundamentals of health workflow process analysis and redesign as a necessary component of complete practice automation; includes topics of process validation and change management.

Component Objectives

- Identify the elements involved in providing patient care within a complex health care setting that must be taken into consideration when examining and proposing changes in workflow processes.
- Create diagram of processes in the healthcare setting that support workflow analysis and re-design.
- Critically analyze the workflow processes in a selected health care setting to determine their effectiveness from the perspective of those being served (i.e., patients), those providing the services (i.e., professional and non-professional staff), and the organization's leadership (i.e., decision makers).
- Propose ways in which quality improvement methods, tools and health IT can be applied within a healthcare setting to improve workflow processes.
- Suggest approaches that would ensure the success of workflow re-design from development and presentation of the implementation plan, to facilitation of decision making meetings, implementation of the changes, evaluation of the new processes, sustainability of new workflow processes, and continuous quality improvement efforts to achieve meaningful use.
- Apply to these activities an understanding of health IT, meaningful use, and the challenges practice settings will encounter in achieving meaningful use.

Unit 10.1 Concepts of Processes and Process Analysis

This unit focuses on the six aims for health care process improvement. In this unit students are helped to understand the concepts of systems, systems thinking and health care processes. Such understanding provides a foundation for the study of clinical process analysis and redesign.

Unit 10.2: Process Representation

This unit prepares students to graphically represent a workflow process that reflects accepted standards for such representation.

Unit 10.3: Interpreting and Creating Process Diagrams

This unit prepares students to **read, interpret, and create**:

1. Flowcharts using ISO 5807 and common quality improvement symbols, and
2. Data flow diagrams in Yourdon notation.

This unit prepares students to **read and interpret**:

3. Data flow diagrams in Gane-Sarson notation,
4. Class, Activity and State diagrams in UML notation, and
5. Entity-relationship diagrams in crow's foot notation.

Unit 10.4: Acquiring Clinical Process Knowledge

This unit prepares the student for conducting initial contact and with a health care facility, assessing the facilities readiness for change and using group methods for the purpose of process analysis and redesign.

ONC Curriculum Version 2 – Component Summary

Unit 10.5: Process Analysis

This unit focuses on the optimization of health care workflows and how the Practice Workflow and Information Management Redesign Specialist can help health care facilities achieve and sustain such optimization.

Unit 10.6: Process Redesign

This unit focuses on the redesign and automation of health care workflows and how the Practice Workflow and Information Management Redesign Specialist can help health care facilities make clinical health care processes safer, more efficient and more effective.

Unit 10.7: Facilitating Optimization Decisions

Coordinating a process optimization meeting and using appropriate group methods to discuss and make decisions on inefficiencies and opportunities for streamlining manual and computer-aided processes. This unit will prepare students to present and review process analysis and optimization findings with health care facility decision makers, and to facilitate decisions on actions to be taken.

Unit 10.8: Quality Improvement Methods

Different approaches to quality improvement have been used in health care settings. Because workflow analysts will encounter organizations and people that have experience with a multitude of proven methods and fads, an awareness of the history, methods and tools of quality improvement is critical. This Unit introduces students to these elements of QI, as well as quality reporting.

Unit 10.9: Leading and Facilitating Change

This Unit introduces students to the concept of change, the diffusion of innovation, and the impact of such change on the providers within a health care facility. It enhances their understanding that workflow analysts must be sensitive to the human component as they examine and propose modifications in workflow processes. This Unit prepares the student to recognize and address common change management problems, and to work with individuals and groups to facilitate change.

Unit 10.10: Process Change Implementation and Evaluation

This Unit focuses on helping students develop skills needed to implement and evaluate the effectiveness of changes designed to improve workflow processes and the quality of care in health care facility. This Unit prepares the student to implement a process change by covering three key skill sets: 1) develop a process change plan (implementation plan), 2) communicate a process change plan, and 3) to develop an evaluation plan.

Unit 10.11: Maintaining and Enhancing the Improvements

This Unit focuses on helping the student develop the skills to recognize and access changes that can be maintained, develop alternative processes and methods needed to keep the practice running if the EHR system fails and apply to these activities an understanding of health IT, meaningful use, and the challenges practice settings will encounter in achieving, sustaining and enhancing meaningful use.

ONC Curriculum Version 2 – Component Summary

Component 11 - Configuring EHRs

A practical experience with a laboratory component, addressing approaches to assessing, selecting, and configuring EHRs to meet the specific needs of customers and end-users.

Component Objectives

- Describe the process of migration to an electronic health record (EHR) from organizational strategy, planning, analysis of EHR options, decision-making techniques, training, and implementation strategies.
- Given a case study of a facility moving from a paper health record to an EHR, discuss the migration path from organizational strategy to implementation, including meaningful use criteria.
- Discuss the importance and use of clinical decision support systems for clinical and administrative use.
- Given an EHR system, configure the system to achieve features required for meaningful use, including labs for:
 - a) Building of order sets
 - b) Data entry templates
 - c) Generate quality reports
 - d) Implementation of clinical decision support
- Understand data infrastructure including data architecture, data sets, data repositories, data standards, data types and data dictionaries

Unit 11.1: Migration to an Electronic Health Record System

This Unit focuses upon the process of migrating to an Electronic Health Record System, or EHR, and The Electronic Health Record Life Cycle.

Unit 11.2: Meaningful Use – Practical Implementation

This unit provides an overview of the five guiding principles for meaningful use and defines the metrics that will be used to measure meaningful use. Additionally, this unit covers the timeline and incentives for meeting meaningful use criteria as defined by the Centers for Medicare and Medicaid Services (CMS) and describes the value and qualities provided by a certified EHR.

Unit 11.3: Clinical Decision Support

This unit focuses initially on defining clinical decision support (CDS) and providing an historical perspective, the early approaches to clinical decision support that tended to focus mostly on diagnosis. The focus progresses to more recent approaches, including those that are used with modern electronic health record systems that are somewhat more focused on treatment. This unit is completed with a discussion on computerized provider order entry, or CPOE [C-P-O-E], which brings clinical decision support to the point of care.

Unit 11.4: Lab: Implementing Clinical Decision Support

This unit discusses implementing clinical decision support, which broadly refers to providing clinicians or patients with computer-generated clinical knowledge and patient related information, intelligently filtered and presented at appropriate times, to enhance patient care. A short lecture is followed by a series of hands-on labs and exercises through which students will learn how to configure and use three

ONC Curriculum Version 2 – Component Summary

tools for decision support implemented in the EHR: Alerts or Notifications, Order Checks and Clinical Reminders.

Unit 11.5: Lab: Health Summary and Clinical Reminder Reports

This unit focuses on reviewing basic information related to the creation of quality reports. In addition, the labs and exercises describe how to create and view Health Summary and Clinical Reminder reports - two basic types of quality reports.

Unit 11.6: Lab: Data Entry Templates

This unit will focus on the creation and use of data entry templates. Templates are important tools for collecting data entered into the system manually, as they can help to ensure the quality of the data and provide data capture efficiencies through effective design and use.

Unit 11.7: Lab: Building Order Sets

This unit focuses on the value of order sets through Lab exercises designed to instruct students on how to build order sets within a typical Electronic Health Record, or EHR [E-H-R]. Typically, order sets would be created by clinicians with expertise in treatment plans and they would be able to take those plans and put them into specific order sets within the EHR system.

Unit 11.8: Data Infrastructure

This unit focuses on important terminology related to data and the parts of data infrastructure and architecture; definitions, development, and use of a data dictionary; and the collection of data for secondary use.

Unit 11.9: EHR Implementation in Specific Settings

This unit focuses on the implementation of Electronic Health Records systems in specific settings including acute care settings such as ambulatory care, physician practices, and critical access hospitals, as well as non-acute care settings such as home health care, extended care, rehabilitation facilities, long term care facilities, and the growing area of senior residence housing.

ONC Curriculum Version 2 – Component Summary

Component 12 - Quality Improvement

Introduces the concepts of health IT and practice workflow redesign as instruments of quality improvement. Addresses establishing a culture that supports increased quality and safety. Discusses approaches to assessing patient safety issues and implementing quality management and reporting through electronic systems.

Component Objectives

- Analyze clinical decision-making requirements, including who, what, when, how, and where information is needed.
- Design and implement information technology that supports effective teamwork, fosters open communication and enables shared decision-making to achieve quality patient care
- Analyze clinical workflows to design information technology that supports clinical decision-making and care coordination.
- Design and apply of information technology and standardized practices that support safety and quality
- Formulate activation planning that supports and maintains safety and quality
- Select and apply quality measures for incorporation into information systems to enable review of outcomes of care and identification of improvement opportunities
- Assess findings from quality reviews of reported events to design and implement clinical information system improvements.
- Select improvement tools to assist clinical teams in improving the quality and safety of the electronic health record.
- Monitor use of information technology for inappropriate use leading to hazards and errors
- Design an information technology culture conducive to highly reliable processes built on human factors research.
- Design and implement effective strategies to use information technology to decrease reliance on memory.

Unit 12.1: Introduction to Quality Improvement and Health Information Technology

Introduction to Quality Improvement and Health Information Technology

This unit will introduce the learner to the concept of health care quality and the importance of meaningful use of health information technology in improving health care quality. The Institute of Medicine aims of quality improvement and the Institute of Healthcare Improvement's triple aim are used to frame a discussion of the role of health information technology in leading to improvement of patient safety, efficiency, effectiveness, equity, timeliness and patient-centeredness. The learner is also provided with examples of how health IT can facilitate quality improvement as well as unintended consequences of health IT that can be byproducts of poor system design and user work-arounds.

Unit 12.2: Principles of Quality and Safety for HIT

This unit introduces the learner to the notion of high reliability organizations, and the importance of transparency and speaking up to a culture of safety. Characteristics of a culture of safety are outlined and the role of the HIT professional in this culture is defined. Strategies and tactics for communicating risks and advocating for resolution in a resistant culture are discussed.

ONC Curriculum Version 2 – Component Summary

Unit 12.3: Reliability and Culture of Safety

This unit introduces the learner to the notion of high reliability organizations, and the importance of transparency and speaking up to a culture of safety. Characteristics of a culture of safety are outlined and the role of the HIT professional in this culture is defined. Strategies and tactics for communicating risks and advocating for resolution in a resistant culture are discussed.

Unit 12.4: Human Factors: HIT Design and Complexity

This unit introduces the learner to the concepts of human factors and ergonomics and discusses their role in patient safety. The three types of ergonomics (physical, cognitive, and organizational) are defined, and examples of the application of these design principles to health care and patient safety are provided. This is followed by a review of two approaches to managing error (person and system) and the benefits of using the system approach in health care. The components of the SEIPS Model of work system and patient safety (person, environment, organization, technologies/tools, tasks, processes, and outcomes) are discussed and this model is applied to information technology.

Unit 12.5: HIT Design to Support Teamwork and Communication

The unit focuses on ways in which HIT can be designed to support care coordination. The focus is on electronic tools to support communication and teamwork during hand-off, care planning, and care transitions. Incorporation of automatic referral requests, data transfer to longitudinal records, and shared problem lists and daily goal forms into the EHR is discussed as well as the utility of electronic whiteboards and clipboard tools.

Unit 12.6: Decision Support for Quality Improvement

This unit presents an in depth review of ways in which decision support can enhance quality and safety in patient care. Definitions of decision support are provided. Three cases studies of decision support in a variety of health care settings (inpatient, ambulatory, and public health) are discussed.

Unit 12.7: Safe Workflow Design

This unit introduces the learner to good practices for determining current workflow design and whether this design can be supported by HIT. It also presents ways of assisting users to redesign clinical work-flow as needed without loss of quality and safety in the clinical environment. Discussion of questions to ask when determining hard-wired and mobile technology placement is included.

Unit 12.8: HIT Implementation Planning to Maximize Quality and Safety

This unit focuses the attention of the learner on ways in which HIT implementation can be managed to ensure the quality and safety are maintained during the transition period. Use of internal support pools, super-users, and front-line clinical experts to provide at-the-elbow support during the transition period is discussed. Emphasis is placed on the need for local adaptation and ongoing development of skills so that users can gain expertise in safe use of electronic health records and other information technology.

Unit 12.9: HIT and Infecting a Patient Safety Culture

This unit dives into the specifics of how poor design and misuse of technology can place patients and organizations at risk. A strong case is made for the responsibility of users to monitor information systems for risks and to ensure that they use these systems appropriately. Examples of poor design are

ONC Curriculum Version 2 – Component Summary

provided, as well as their impact on patient care. The HIT professional's role in ensuring attention to usability and compatibility with workflow during the design and testing phase of implementation is discussed.

Unit 12.10: HIT Design for Quality Reporting

This unit discussed the fact that the design of electronic documents and flow sheets have a significant impact on the ability to extract quality measures from the resulting database. The importance of rigorous design and testing of system reports used for quality purposes is emphasized. Sample quality measures that are frequently requested of HIT systems are identified, and questions that guide data extraction are suggested.

Unit 12.11: Data Quality Improvement

This unit will introduce the learner to the importance of data quality and the role of the HIT professional in monitoring and ensuring the quality of data in clinical information systems. The theme of this unit is "beginning with the end in mind" and a review of both measurable and intangible dimensions of data quality is provided. Examples of each dimension are reviewed and a business case for quality is presented.

Unit 12.12: Learning from Mistakes: Error Reporting and Analysis and HIT

Learning from mistakes: error reporting and analysis and HIT

This unit is designed to assist the learner in understanding the role of HIT in error detection and reporting and analysis of errors. The unit pulls together the links between learning from mistakes and the science of safety and safe culture. It includes a review of three tools for error detection and reporting: automated surveillance systems, error reporting systems, and predictive analytics and modeling. Examples of two powerful quality improvement tools (root cause analysis and failure mode effects analysis) are provided and the role of HIT professional in contributing to these efforts is discussed.

ONC Curriculum Version 2 – Component Summary

Component 13 - Public Health Information Technology

For individuals specifically contemplating careers in public health agencies, an overview of specialized public health applications such as registries, epidemiological databases, biosurveillance, and situational awareness and emergency response. Includes information exchange issues specific to public health.

Component Objectives

- Distinguish (draw distinctions) among core functions and essential services of ‘public health’ and ‘clinical care’.
- Synthesize key reasons and current contextual factors for providers in clinical practice to improve public health services and practices using EHRs
- Apply health data definitions and standards, as well as privacy and confidentiality issues, in typical public health scenarios.
- Summarize the strategies, features, and systems needed for public health agencies to define and build the necessary connections to EHRs as identified by meaningful use legislation.
- Describe the roles and functions of existing public health data and health databases and networks
- Identify current needs and future directions for EHR biosurveillance, disaster-preparedness, and situational awareness in improving public health.
- Summarize/describe the main role, functions and applications of public health reporting, alerts and decision support systems.
- Summarize the role, functions and applications of public health IT for health promotion and chronic disease prevention
- Delineate the critical role of advocacy in adoption/use of EHRs and Consumer functions for PHRs to improve public health.

Unit 13.1: Overview & contribution to public health through Electronic Health Record use

Synthesize key reasons and current contextual factors for providers in clinical practice to improve public health practice using EHRs.

Unit 13.2: Privacy, Confidentiality and Security of Public Health Information

Apply health data definitions and standards, as well as privacy and confidentiality issues, in typical public health scenarios.

Unit 13.3: Data Standards in Public Health Information Technology

Apply health data definitions and standards, as well as privacy and confidentiality issues, in typical public health scenarios.

Unit 13.4: Public health enabled electronic health records and the role of public health in health information exchange

Summarize/describe the main role, functions and applications of public health-enabled Electronic Health Records (EHRs).

Unit 13.5: Epidemiological databases and registries – Public health information tools

Explain how varying types of information technologies have application in public health practice.

ONC Curriculum Version 2 – Component Summary

Unit 13.6: Biosurveillance, Situational awareness and disaster response

Identify current needs and future directions for EHR biosurveillance, disaster-preparedness, and situational awareness in improving public health.

Unit 13.7: Public health reporting, alerts and decision support

Summarize the essential public health services and methods by which they can be improved through the use of EHRs in the context of the clinical care environment

Unit 13.8: The potential of public health IT for health promotion and chronic disease prevention

Explain a novel approach to developing and implementing health promotion programs in public health practice.

Unit 13.9: Quality Reporting

Summarize/describe the main role, functions and applications of public health reporting, alerts and decision support systems.

Unit 13.10: Encouraging adoption/use of population health functions for EHRs and Consumer functions for PHRs

Delineate the critical role of advocacy in adoption/use of EHRs and Consumer functions for PHRs to improve public health.

ONC Curriculum Version 2 – Component Summary

Component 14 - Special Topics Course on Vendor-Specific Systems

Provides an overview of the most popular vendor systems highlighting the features of each as they would relate to practical deployments, and noting differences between the systems.

Component Objectives

- Assess and compare common commercial Electronic Health Record (EHR) systems using KLAS ratings in training and organizational decision-making contexts.
- Apply Certification Commission for Health Information Technology (CCHIT), meaningful use, Joint Commission and National Patient Safety Goals to decisions about commercial EHR vendor selection, when given typical workplace scenarios.
- Evaluate key factors (costs of an EHR, including capital, licensing, maintenance and staffing, and stakeholder needs) into workplace decisions for selecting vendor-specific systems
- Analyze the functionality of a vendor EHR system, given a set of user needs
- Compare database architectures employed by different vendor applications to evaluate how these impact performance and extensibility
- Evaluate EHR systems based on vendor strategies for terminology management, knowledge management and data exchange
- Compare decision support capabilities and customizability, given different vendor EHRs
- Evaluate training and go-live strategies of different EHR vendors in terms of impact on cost, workflow, and patient safety.

Unit 14.1: Common commercial electronic health record (EHR) systems used in ambulatory and inpatient care settings

Assess and compare common commercial EHR systems using KLAS ratings during training or to facilitate organizational decision-making.

Unit 14.2: Certification of commercial Electronic Health Records (EHRs)

Apply Certification Commission for Health Information Technology (CCHIT), meaningful use, Joint Commission and National Patient Safety Goals to decisions about commercial EHR vendor selection.

Unit 14.3: How do organizations select an EHR? Lessons from the front lines

Evaluate key factors (costs of an EHR, including capital, licensing, maintenance and staffing, and stakeholder needs) into workplace decisions for selecting vendor-specific systems.

Unit 14.4: Electronic Health Record (HER) Functionality

Analyze the functionality of a vendor EHR system, given a set of user needs.

Unit 14.5: System and database architectures used in commercial EHRs

Compare database architectures employed by different vendor applications, for fulfilling different user purposes.

Unit 14.6: Vendor strategies for terminology, knowledge management, and data exchange

Evaluate EHR systems based on vendor strategies for terminology management, knowledge management and data exchange.

ONC Curriculum Version 2 – Component Summary

Unit 14.7: Assessing decision support capabilities of commercial EHRs

Compare decision support capabilities and customizability, given different vendor EHRs.

Unit 14.8: Vendor-specific training and go-live strategies

Evaluate training and go-live strategies of different EHR vendors in terms of impact on cost, workflow, and patient safety.

ONC Curriculum Version 2 – Component Summary

Component 15 - Usability and Human Factors

Discussion of rapid prototyping, user-centered design and evaluation, usability; understanding effects of new technology and workflow on downstream processes; facilitation of a unit-wide focus group or simulation.

Component Objectives

- Articulate a systems approach to usability and human factors as it applies to health information technology.
- Explain the cognitive consequences of health information technology on clinical performance.
- Identify the consequences of suboptimal design in the delivery of healthcare.
- Apply methods of cognitive research, sources of usability evidence, and principles of user-centered design to decisions regarding systems evaluation, technology evaluation, and iterative design, given a population of users.
- Apply requirements engineering methods to inform design and technology selection.
- Demonstrate concept knowledge of cognition and human performance models in their relevance to systems evaluation methods.
- Apply concept knowledge of cognitive, physical and organization ergonomics to human factors engineering.
- Select the most appropriate usability evaluation method, given particular system, setting, and development phase.
- Apply principles of usability and design to critiquing EHR systems and to making recommendations for iterative improvement.
- Diagnose problems associated with a clinical decision support system.
- Apply cognitive methods of analysis to medical device testing.
- Evaluate user interface designs using cognitive methods of analysis, usability testing, and Nielsen's heuristic evaluation method.
- Diagnose various types of error and create or select potential solutions.
- Select appropriate technology input methods given different technology uses, user populations and contexts.
- Describe how information visualization can support and enhance the representation of trends and aggregate data.
- Describe the role of mobile and ubiquitous computing in healthcare.

Unit 15.1: People and technology, studies of technology

Apply methods of cognitive research, sources of usability evidence, and principles of user-centered design to decisions regarding systems evaluation, technology evaluation, and iterative design, given a population of users.

Unit 15.2: Requirements engineering

Apply requirements engineering methods to inform design and technology selection.

Unit 15.3: Cognition and Human Performance

Demonstrate concept knowledge of cognition and human performance models in their relevance to systems evaluation methods.

ONC Curriculum Version 2 – Component Summary

Unit 15.4: Human factors and healthcare

Apply concept knowledge of human factors to the evaluation of systems-design and the study of human errors and patient safety.

Unit 15.5: Usability evaluation methods

Select the most appropriate usability evaluation method, given particular system, setting, and development phase.

Unit 15.6: Electronic health records and usability

Apply principles of usability and design to critiquing EHR systems and to making recommendations for iterative improvement.

Unit 15.7: Clinical decision support and usability

Diagnose problems associated with a clinical decision support system.

Unit 15.8: Approaches to design

Characterize the multifaceted nature of the design process and evaluate whether a given user interface embraces sound principles of design to support usability goals

Unit 15.9: Ubiquitous Computing

Describe the role of mobile and ubiquitous computing in healthcare

Unit 15.10: Designing for safety

Diagnose various types of error and create or select potential solutions.

Unit 15.11: Input and selection

Select appropriate technology input methods given different technology uses, user populations and contexts.

Unit 15.12: Information visualization

Describe how information visualization can support and enhance the representation of trends and aggregate data.

ONC Curriculum Version 2 – Component Summary

Component 16 - Professionalism/Customer Service in the Health Environment

This component develops the skills necessary to communicate effectively across the full range of roles that will be encountered in health care and public health settings.

Component Objectives:

- Explain key elements of customer service in health IT.
- Demonstrate appropriate behaviors in simulations of health IT customer service.
- Demonstrate effective written and oral communication approaches to common communication interactions.
- Identify core elements of effective communication and techniques to resolve conflicts.
- Identify ethical and cultural aspects of communication.

Unit 16.1 Customer Service in Healthcare IT

This unit describes Customer Service in Healthcare IT.

Unit 16.2 Professional Behavior in the Healthcare Environment

This unit describes Professional Behavior in the Healthcare Environment.

Unit 16.3 Overview of Communication Relevant to Health IT

This unit describes the Overview of Communication Relevant to Health IT.

Unit 16.4 Key Elements of Effective Communication

This unit describes Key elements of effective communication.

Unit 16.5 Regulatory Issues: HIPAA and Standard Precautions

This unit describes Regulatory Issues: HIPAA and Standard Precautions.

Unit 16.6 Team and Small Group Communication

This unit describes Team and Small Group Communication.

Unit 16.7 Handling Conflict

This unit describes Handling Conflict.

Unit 16.8 Ethical and Cultural Issues Related to Communication and Customer Service

This unit describes Ethical and Cultural Issues Related to Communication and Customer Service.

Unit 16.9 Personal Communications and Professionalism

This unit describes Personal Communications and Professionalism.

ONC Curriculum Version 2 – Component Summary

Component 17 - Working in Teams

An experiential course that helps trainees become “team players” by understanding their roles, the importance of communication, and group cohesion.

Component Objectives:

- Establish and monitor ground rules, or rules of engagement, that serve as behavioral guidelines for members of teams involved in HIT.
- Develop an HIT action plan that can be easily adapted to changing situations, environments, and goals across a variety of health and healthcare settings.
- Communicate a clearly articulated position in writing and speech.
- Incorporate diversity in values, critical thinking, and judgments that amplifies the best of individual performance toward the HIT team mission.
- Provide leadership for continuous assessment and learning on practices, processes, and outcomes of the HIT team mission.
- Develop a sustaining framework that maximizes the integrated power of teams while recognizing excellence in individual performance of various stakeholders involved in HIT (patients, families, communities, nation, etc.).

Unit 17.1: Health IT Teams: Examples and Characteristics

This unit is an introductory unit designed to highlight different types of health information technology teams and the purpose and functions of its different members. Characteristics of effective teamwork will also be discussed with emphasis on the organizational structure, individual contributions, and team processes. Why teams are valued for their collaborative efforts and teamwork will be outlined in this component. Activities for the learner include a virtual hospital tour that will facilitate the learner to explore different areas where HIT teams may be used, to interview a member of a HIT team and explore their job, purpose, skills, and contributions made to the team in addition to serving as a HIT team member who needs to select HIT team members to build an effective team for the work outlined in the case.

Unit 17.2: Forming and Developing a Team for HIT

This unit is designed to introduce students to the stages of team development: forming, storming, norming, and performing with the needs of the team identified at each stage. Common goals and purposes will be described in addition to information on key factors needed to maintain an effective team.

Unit 17.3: Initial Tools for Teaming: Ground Rules & Action Plans for HIT Team

This unit is designed to introduce learners to specific guidelines and rules that may be associated with teams and working on a HIT team. A realistic learning activity that focuses on the learner developing a team action plan will bring this unit to the forefront for application and understanding of the team plan. Two major communication strategies, active listening and assertive communication techniques will be included in this component and demonstrated through selected exercises in the module.

Unit 17.4: Individual Roles and Team Mission

This unit is designed to describe individual roles and tasks of specific health IT team members. Roles will be divided and discussed that are identified by group roles that include those in task functions,

ONC Curriculum Version 2 – Component Summary

maintenance functions, and individual functions. The roles and responsibilities will be defined for the team members' functions and aligned with the ground rules for working in teams. Clues to dysfunctional team members will be addressed along with discussion on how to avoid these behaviors and activities.

Unit 17.5: Leveraging Integration Techniques: Power of HIT Team Dynamics

This unit will discuss techniques for team members to problem solve within their teams so the team can be more effective. Activities will include how to conduct a SWOT analysis and mind maps within this component. Different activities described within the module will be differentiated between team or individual task. Activities will include a SWOT analysis of a case-based team and other experiential activities associated with team tasks and specific roles within the team.

Unit 17.6: Articulating Feedback and Feedforward: Tracking Success and Change

This unit will provide information to the learner on tools and techniques for giving and receiving feedback regarding HIT team performance. Elements introduced include the use of formative and summative evaluations, conflict management, and appropriate communication channels. Participants will evaluate individual behaviors regarding stated ground rules for functioning as a member of an HIT team. The difference between feedback and feedforward will be clarified as students will incorporate the seminal elements of positive change into their dealings with others. Tools for serving as a change agent and tracking success will also be practiced by students in team exercises. Based upon the belief that we can change the future but we cannot change the past, participants will practice the steps to both delivering and receiving feedforward information. Also based on the belief that it can be more productive to help people be right than to prove they are wrong, participants will be challenged with developing strategies for applying feedforward mechanisms within HIT team involvement.

Unit 17.7: Leadership: All Members as Leaders – Leaderful Teams

This unit will challenge participants to critically evaluate elements that lead to success in the field of HIT. The changing role of leadership will be explored. Leadership has taken on new requirements as we have moved through the information and biotech ages into the conceptual age where the knowledge worker is being continually replaced by the conceptual leadership at every level in organizations. The expansive role of leadership that requires each team player to be prepared to “carry the torch” and lead others is a fundamental building block for HIT teams. Participants will investigate leadership behavior across HIT platforms, identify key leadership skills, and demonstrate personal abilities across those skill areas as related to HIT teams.

Unit 17.8: Sharing Resources and Information: Tools to Optimize Performance of HIT Teams

This unit will equip participants with a working appreciation for tools and techniques that enable HIT teams to optimize performance both within their team and in collaboration with other teams, units, and organizations. Specific technologies and methods will be introduced and applied to HIT team settings. Participants will be provided an opportunity to use several of these tools and techniques as they simulate HIT team functions. Outdated views on how people share information will be highlighted. New frameworks in thinking regarding information access and decision making activities for successful HIT teams will be discussed. Meeting to share information will be discouraged as participants will become adept using some basic tools for collaboration. Meeting for purposes of clarifying options and making decisions will be encouraged along with applying tools and techniques to

ONC Curriculum Version 2 – Component Summary

facilitate such meetings. Participants will select appropriate structural components to enable greater efficiencies of information sharing and decision making by HIT teams.

Unit 17.9: Expanding Value: Tools for Collaboration Across Time and Space in HIT-Related Activities

This unit will provide information to the learner on global collaboration tools so HITS team members can communicate 24/7 and worldwide, if needed. There are no longer borders or barriers to interacting with other HIT personnel or others with the sophisticated technology used today. The learner will participate in a virtual scavenger hunt to discover tools needed for a HITS project assigned in this module. In addition, future tools, equipment, and devices to connect health IT all over the world will be highlighted. A paper on the future face of healthcare HITS teams and the collaborations worldwide will be discussed with activity time spent on creating what the future in health IT may be like 25 years from now.

Unit 17.10: Barriers to Success: Reading Early Warning Signs to HIT Team Failure

This unit prepares participants to recognize elements that lead to HIT team failures and provides several frameworks that can serve to maintain appropriate monitoring of more typical symptoms of team dysfunction. Elements of selfish behaviors, tool seduction, lack of confidence, arrogance, lone heroism, cowardice, and comfort will be examined along with appropriate responses to each. Effects such as common knowledge, in-group bias, false consensus, and transactive memory will be investigated along with proper mechanisms to alleviate negative consequences and mitigate further damage. Lessons will be gained by inspecting case histories of HIT teams involved in each of these elements. Participants will explore frameworks to heighten awareness and early diagnosis of symptoms that lead to HIT team failures.

Unit 17.11: Positioning for High Performance Teaming: Challenges and Opportunities in the HIT Environment

This unit provides participants an opportunity to gain insights into the criteria, processes, and structures that support the development of high performance for HIT teams. As Observations from various industries, sports, and military examples will be compared with HIT team environments. Participants will draw from personal experiences in developing criteria for providing the requisite structure to support high performance teaming.

Unit 17.12: Life Cycle of HIT Teams: Reforming and Repositioning Techniques

This unit introduces participants to the natural stages in team development and the normative life cycles of teams. The process of handling change will be investigated as participants work through understanding the elements of immobilization, denial of change, incompetence, acceptance of reality, frustration, understanding, and integration. Participants will be introduced to techniques employed to structure HIT teams for specific purposes and repurposing teams for new tasks.

ONC Curriculum Version 2 – Component Summary

Component 18 - Planning, Management and Leadership for Health IT

This component targets those preparing for leadership roles, principles of leadership and effective management of teams. Emphasis on the leadership modes and styles best suited to IT deployment.

Component Objectives:

- Explain leadership traits and theories.
- Recognize leadership's role in IT and EHR project success and project failure.
- Describe the importance of the effective leadership of teams.
- Demonstrate team leadership competencies.

Unit 18.1 Introduction to Leadership

This unit describes leadership styles and theories of leadership.

Unit 18.2 The Management and Leadership Distinction

This unit describes the management and leadership distinction.

Unit 18.3 Key Concepts Associated with Leadership

This unit describes key concepts associated with leadership, including creativity and emotional intelligence.

Unit 18.4 Effective and Ineffective Leaders

This unit describes the traits of effective and ineffective leaders.

Unit 18.5 Overview of the IT Strategic Planning Process

This unit provides a high level of overview of the IT Strategic Planning Process.

Unit 18.6 Achieving External Alignment

This unit describes achieving external alignment among various stakeholders.

Unit 18.7 Components of Successful Teamwork

This unit describes the components of successful teamwork.

Unit 18.8 Effective Management of Teams - Twelve C's of Team

This unit describes twelve characteristics of effective management of teams.

Unit 18.9 Managing and Resolving Conflict

This unit describes methods for managing and resolving conflict.

ONC Curriculum Version 2 – Component Summary

Component 19 - Introduction to Project Management

An understanding of project management tools and techniques that results in the ability to create and follow a project management plan.

Unit 19.1: Overview of Health IT Projects

Students will receive a broad overview of project management including some distinctive characteristics of health IT projects. This unit includes several real scenarios to illustrate the diversity of projects in health IT.

Unit 19.2: Project Life Cycles

This unit provides an overview of various project life cycles so that students can assess their appropriateness for use depending on characteristics of a project. Students examine processes, knowledge areas, and organizational influences that are critical to successful project management.

Unit 19.3: Project Initiation

Students learn what is necessary to get projects off to a strong start. Critical activities are to prepare a project charter and to identify and engage the project stakeholders.

Unit 4: Project Planning Overview

In this unit, students will learn how to effectively plan projects and to develop a project management plan. Several key documentation components will be introduced.

Unit 19.5: Managing Project Scope

This unit addresses a critical determinant of project success: defining and managing the scope of the project. Students learn the importance of eliciting stakeholder requirements and developing effective work breakdown structures.

Unit 19.6: Managing Project Time, Cost, and Procurements

In this unit, students will gain an understanding of how to manage project schedules and spending. The unit will cover broad topics such as purchasing, procurement, cost estimation and scheduling.

Unit 19.7: Managing Project Risk

A key to successful health IT projects is the pro-active management of risks: beginning with the preparation of a risk management plan. Risk management will be a continuing activity throughout the project, to identify risks and to plan and implement risk responses.

Unit 8: Team Management and Communications

Whatever role you play on a project team, it is essential to understand basic concepts of team management and communications. This unit covers key elements of managing and communicating in a team, including the development of an HR and communications plan.

Unit 19.9: Project Monitoring and Control

Project managers use monitoring and control tools and techniques to assess plans and deliverables, evaluate progress against plans, manage change requests, and review all project activities. It is critically important to keep the project within scope, budget, and schedule to meet stakeholder expectations.

ONC Curriculum Version 2 – Component Summary

Unit 19.10: Managing Quality

Quality is an elusive but essential component and consideration in any project. This unit will cover quality management planning and key characteristics of quality assurance and its impact on project management.

Unit 19.11: Project Closure and Transition

It is essential that project managers know all the processes required to bring a project to a successful conclusion. Key steps include completing all deliverables on time, gaining customer acceptance, documenting the project lessons learned, and managing the transition to operations.

Unit 19.12: Application of Health IT Project Management

This unit involves both analysis of and hands-on application of project management tools and techniques to real-life health IT scenarios. Students will participate in team-based activities addressing scenario-based challenges in health IT projects.

ONC Curriculum Version 2 – Component Summary

Component 20- Training and Instructional Design

Overview of learning management systems, instructional design software tools, teaching techniques and strategies, evaluation of learner competencies, maintenance of training records, and measurement of training program effectiveness.

Component Objectives

- Plan, design, develop (produce), deliver, and evaluate technology-based instruction according to sound instructional design models and principles.
- Describe the training cycle by the Instructional Systems Design method and the phases of the ADDIE model of instruction design given a population of adult learners.
- Plan and implement an instructional needs assessment given a specific population of users in a health care setting.
- Construct a lesson plan using appropriate instructional methods and approaches, given a specific population of learners.
- Construct an instructional product (simple online tutorial) using the appropriate media based instructional method, such as customized images, customized video (e.g., EHR screen captures).
- Create a custom PowerPoint presentation using the principles of effective PowerPoint design given a particular training program.
- Demonstrate effective public speaking skills and proper operation of computer and AV equipment for a multimedia presentation, given a set of user needs.
- Plan and conduct student assessment and program evaluation given different population contexts.
- Design a training program in LMS that adhere to the standards and open source initiatives in online learning.
- Select and implement Web 2.0 technologies as instructional technologies given a specific platform and training program.

Unit 20.1: Introduction to Training and Adult Learning

Apply the Instructional Systems Design method and the phases of the ADDIE model of instruction design, to a given population of adult learners.

Unit 20.2: Needs Analysis

Plan and implement an instructional needs assessment, given a specific population of users in a health care setting.

Unit 20.3: Creating a Lesson Plan

Construct a lesson plan using appropriate instructional methods and approaches, given a specific population of learners.

Unit 20.4: Selecting and Working with Media

Construct an instructional product (simple online tutorial) using appropriate media, such as customized images, customized video (e.g., EHR screen captures).

Unit 20.5: Building & Delivering Effective PowerPoint Presentation

Create a custom PowerPoint presentation using the principles of effective PowerPoint design, given a particular training program and learner population.

ONC Curriculum Version 2 – Component Summary

Unit 20.6: Assessments

Conduct student outcome assessments and program evaluations in given training contexts.

Unit 20.7: Learning Management Systems

Design a training program in Learning Management Systems (LMS) that adhere to the standards and open source initiatives in online learning.

Unit 20.8: Web 2.0 and Social Networking Tools

Select and implement Web 2.0 technologies as instructional technologies given a specific platform and training program.