Curriculum Development Centers Program

Awardee of The Office of the National Coordinator for Health Information Technology

HEALTH IT WORKFORCE CURRICULUM
COMPONENT BLUEPRINT
Version 2.0/Spring 2011

Component Number: 9
Component Name: Networking and Health Information Exchange

Component Description (from FOA):
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.

Assigned Institution: Duke University
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Team Members: Harry Bulbrook
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Workforce Roles:

Component Objectives:
At the completion of this component, the student will be able to:

1. Explain the OSI representation of the various layers involved in networking, including the general functions of each layer and their interconnections
2. Explain the concept of the Application layer
3. Explain the concept of the Presentation layer
4. Explain the concept of the Session Layer
5. Explain the concept of the Transport layer
6. Explain the concept of the Network layer
7. Explain the concept of the Data Link layer
8. Explain the concept of the Physical layer
9. Explain connection-oriented versus connectionless communication

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- Explain the use of network addressing including security considerations and vulnerabilities

Component Units with Objectives

Unit 1 (ISO Open Systems Interconnection (OSI)):
Description:
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.

Objectives:

1. Explain the OSI representation of the various layers involved in networking, including the general functions of each layer and their interconnections
2. Explain the concept of the Application layer
3. Explain the concept of the Presentation layer
4. Explain the concept of the Session Layer
5. Explain the concept of the Transport layer
6. Explain the concept of the Network layer
7. Explain the concept of the Data Link layer
8. Explain the concept of the Physical layer
9. Explain connection-oriented versus connectionless communication
10. Explain the use of network addressing including security considerations and vulnerabilities

Unit 2 (Network media and hardware communication devices):
Description:
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.

Objectives:

1. Select appropriate network media types (such as Ethernet and Wireless) to facilitate networking and data exchange, taking into account access and regulatory requirements
2. Select appropriate hardware devices (such as routers, switches, and access points) to facilitate networking and data exchange, taking into account access and regulatory requirements

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Unit 3 (National and International Standards Developing Organizations):
Description:
This unit introduces students to the national and international organizations that create standards used in networking and health information exchange

Objectives:

1. Explain why standards related to networking and health information exchange are important, particularly in the current environment.
2. Standards development
    - How standards are developed
    - Who develops them
    - How standards are accredited
    - How standards are selected
3. Define the different categories of standards
4. Demonstrate how to find, obtain, and use standards that are needed to facilitate networking and health information exchange
5. To understand the organizations that develop standards for the international community and for the United States.
6. To develop an understanding of the kinds of standards being developed and for what purposes.
7. To learn about standards developing organizations and the standards they create – a continuation of the focusing on U.S. standards bodies

Unit 4 (Basic health data standards):
Description:
This unit provides an orientation to the important data-related standards that enable interoperable health data interchange

Objectives:

1. Understand why it is necessary to use a common set of data elements with common names to be able to exchange and understand data from other places.
2. Understand what is meant by semantic interoperability.
3. Understand many of the sets of controlled vocabularies in use today – how they are used and who requires their use.
4. Understand the use, purpose and interrelation among sets of controlled vocabularies in use today.
5. Identify the more common controlled vocabularies in use today: ICD, CPT, DRG, NDC, RxNorm, and LOINC

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6. Understand the use, purpose and interrelation among sets of controlled vocabularies in use today
7. Identify the more common controlled vocabularies in use today: SNOMED, MEDCIN, MedDRA, Nursing terminologies, MeSH and UMLS
8. Understand data elements; attributes of data elements
9. Understand contribution of master meta-dictionary of data elements to semantic interoperability
10. Explain how data structures can be built from basic data components
11. Explain how templates and archetypes facilitate networking and information interchange

Unit 5 (EHR Functional Model Standards):

Description:

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

Objectives:

1. Understand linking and aggregating data at all levels
2. Understand how data may be interchanged among heterogeneous settings without loss of information
3. Understand HL7 v2.x messaging communication standard
4. Understand HL7 v3.0 messaging standards
5. Understand other data interchange standards including DICOM, IEEE, and IHE
6. Explain how model-based standards are created
7. Define the methodology development framework
8. Describe HL7 v3.0 messaging standards
9. Discuss other data interchange standards including DICOM
10. Understand imaging standards
11. Understand standards for pharmacy services
12. Understand interface standards for medical devices
13. Understanding claims and reimbursement standards
14. Understand concept of profiling
15. Understand the use and value of implementation guides

Unit 6 (Health data interchange standards):

Description:

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

Objectives:

1. Understand the definition(s) of an Electronic Health Record
2. Understand architecture for an EHR

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3. Identify and understand key standards for the EHR
4. Understand the HL7 EHR Functional Model Standards
5. Understand functional profiles
6. Understand the standards for Functional Models for the PHR
7. Understand the certification requirements for the EHR, PHR and functional profiles
8.

Unit 7 (Supporting standards for EHR applications):

Description:

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

Objectives:

1. Understand the family of clinical decision support standards, including Arden Syntax, GELLO, and the Infobutton
2. Understand Clinical Guideline standards
3. Understand single sign-on standards and the HL7 Clinical Context Object Workgroup (CCOW) standard
4. Understand regulatory standards and standards enhancing patient safety, including reporting requirements
5. Understand Bar Code standards
6. Understand standards for master patient index, patient registries, and record locating standards
7. Understand standards for clinical guidelines
8. Understand object-oriented expression language for clinical decision support – GELLO
9. Understand the Infobutton
10. Understand disease management
11. Understand other clinical decision support applications
12. Understand other standards that help to support networking and reporting requirements as well as functionality to optimize the connectivity among heterogeneous systems deployed within a single enterprise
13. Understand single sign-on standards and the HL7 Clinical Context Object Workgroup (CCOW) standard
14. Understand regulatory standards
15. Understand issues relating to person identifiers, master patient indexes, and record locator services

Unit 8 (Enterprise Architecture Models):

Description:

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

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Objectives:

1. Explain regional healthcare networks – policy and implementation strategies
2. Explain the concept of a Nationwide Healthcare Information network
3. Explain the significance of Service Oriented Architecture in networking and health information exchange networks
4. Explain the value of an Enterprise Architecture in networking and health information exchange networks
5. Describe key elements of various service oriented architecture platforms and infrastructure options

Unit 9 (Privacy, confidentiality, and security issues and standards):

Description:

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

Objectives:

1. Explain the concepts of privacy and confidentiality requirements and policies and learn how to implement the requirements
2. Describe how to secure data storage and transmission using data encryption, signatures, validation, non-repudiation, and integrity (PKI, certificates, and security protocols)
3. Define access control methods
4. Analyze access restrictions to data storage and retrieval (physical and software)

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