

Learning Objectives for *Update in Health Information Technology: Healthcare Data Analytics*

Unit 1: General Health Care Data Analytics

- Describe a basic overview of data analytics in health care.
- Describe the nine steps of the data analytics process.
- Categorize data into the different types.
- Define common terms used in data analysis.
- Determine whether data fits the definition of Big Data.
- Summarize the challenges faced when working with Big Data.

Unit 2: Extracting and Working with Data

- Describe reasons why data needs to be cleaned or modified before analysis.
- Demonstrate ability to identify and correct basic errors in data.
- Demonstrate ability to perform descriptive statistics.
- Demonstrate ability to use pivot tables.
- Describe the relationship between a database in a health IT system and data analysis tools.

Unit 3: Population Health and the Application of Health Information Technology

- Define the terms and describe the perspectives related to population health and public health.
- Discuss paradigms and strategies relevant to improving the health of populations.
- Summarize the potential for health IT to improve the health of populations within public health programs and integrated health care delivery systems.

Unit 4: Applying Health IT to Improve Population Health at the Community Level

- Describe the frameworks relevant to the concept of population health at the community level.
- Examine other types of factors, such as social factors and nonmedical factors, and discuss how they impact health and wellness.

- Compare and contrast the traditional public health perspectives with the population health perspective.
- Summarize the potential for health information technology to improve the health of populations at the community/geographic level.

Unit 5: Identifying Risk and Segmenting Populations: Predictive Analytics for Population Health

- Define and discuss perspectives related to the concept of risk measurement and segmentation within the population health context.
- Describe the commonly used case identification/predictive measurement/modeling tools.
- Discuss the inner workings of commonly used risk adjustment and predictive modeling tools.
- State some examples and use cases of how risk scores derived from this methodology are applied in different administrative or clinical contexts to help segment a population.
- Discuss a case study of how one common risk segmentation/case finding method has been applied to population health.
- Examine the role of various electronic data sources in risk identification/segmentation.
- Identify and discuss the developing frontiers in the population-based predictive modeling field.

Unit 6: Big Data, Interoperability, and Analytics for Population Health

- Identify challenges in using population health data sources, including issues related to big data, interoperability, and population segmentation.
- Describe the conceptual and practical challenges of developing valid and reliable population health analytic methods.
- Explain how population health analytic models are evaluated and compared against each other.
- Explain the challenges and opportunities of population health analytics in special populations, such as pediatric, mental health, and long-term care populations.
- Describe methods and tools commonly used for population health analytics.
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- Analyze and critique a number of sample population health analytic results.
- Describe a number of existing programs that are guided by population health analytics.

Unit 7: Data Analytics in Clinical Settings

- Describe the current state of data analytics in clinical settings.
- Identify key tools and approaches to improve analytics capabilities in clinical settings.
- Describe different governance and operations strategies in analytics in clinical settings.

- Discuss value-based payment systems and the role of data analytics in achieving their potential.
- Analyze data used in population management and value-based care systems.

Unit 8: Risk Adjustment and Predictive Modeling

- Define risk adjustment, predictive modeling, and validations of models in health care.
- Identify the health care and other data needed to perform risk adjustment and predictive modeling.
- Relate risk adjustment and population segmentation to allocation of health care resources and health care redesign.
- Discuss uses of risk adjustment and modeling in value-based models of care.
- Delineate the use of health information technology in the creation, delivery, and evaluation of prediction models.
- Describe ethical considerations in risk adjustment in population management.

Unit 9: Overview of Interoperable Health IT

- Define health care interoperability.
- Summarize the vision and benefits of interoperable health IT.
- Identify and examine several barriers and challenges to obtaining interoperable health IT.
- Discuss the U.S. strategy for health interoperability.

Unit 10: Standards for Interoperable Health IT

- Explain why standards are required, how they are developed, and how adoption is encouraged.
- Name and describe the types of interoperability standards available.
- Summarize functionality of HL7 V2®, CDA®/CCDA, and FHIR®.
- Recognize HL7 V2® messages, CDA® documents, and FHIR® resources.

Unit 11: Implementing Health Interoperability

- Identify major tasks required to implement interoperability.
- Explain why interoperability implementation projects are needed.
- Define and discuss each phase of the interoperability implementation lifecycle.
- Describe how to apply each phase of the interoperability implementation lifecycle to simple interoperability implementation problems.
- List types of production issues with interoperability and identify and describe support strategies.

Unit 12: Ensuring the Security and Privacy of Information Shared

- Identify applicable federal laws and regulations related to protected health information shared during care coordination.
- Assess processes and systems to ensure compliance with applicable privacy and security regulations during care coordination.
- Explain the challenges of establishing, preserving, and restoring trust from multiple stakeholder perspectives.
- Review interoperable systems for weaknesses in structure or processes, which may result in a loss of trust.
- Discuss the need for data provenance.
- Analyze the system specifications and functionality to establish data provenance.

Unit 13: Secondary Use of Clinical Data

- Describe the secondary uses or reuses of clinical data including, but not limited to, the electronic health record, or EHR.
- Discuss the limitations and challenges of reusing clinical data.
- Conduct a data re-use analysis for health care quality measurement utilizing a sample data set.

Unit 14: Machine Learning and Natural Language Processing

- Describe the major tasks for which machine learning is used.
- Compare and contrast the major approaches for machine learning.
- Describe the major tasks for which natural language processing is used.
- Discuss the major approaches and challenges for processing clinical narratives.