



The Office of the National Coordinator for Health Information Technology



Introduction to Health Care Data Analytics

Module 4: Data Analysis Tools and Techniques

Lecture a

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Data Analysis Tools and Techniques Learning Objectives

- Define data analytics terms
- Describe the process steps of data analytics and the tools used in each step
- Describe the role of the data analyst
- Identify tools and techniques used to analyze and interpret health care data effectively
- Describe key database concepts.
- Describe the various types of databases and how they are structured
- Describe key data warehouse concepts
- Describe enterprise data architecture as seen in health care organizations

Overview

Data analysis “is a process of inspecting, cleaning, transforming, and modeling data with the goal of discovering useful information, suggesting conclusions, and supporting decision-making”



Wikipedia, 2016

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The Role of the Data Analyst

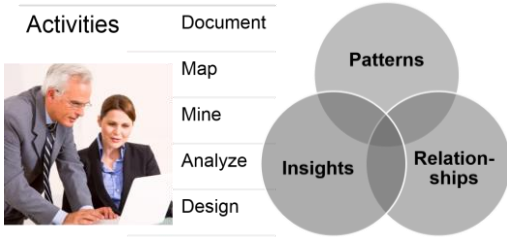


Image by Ambro, 2011

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The Process of Data Analysis



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Problem Definition

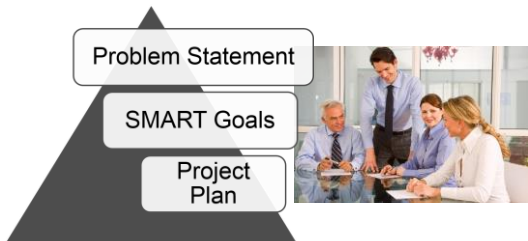


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Data Management

Goal: Capture quality data and enable credible outcomes

- **Data Collection**
 - Acquiring data from the source systems
- **Data Evaluation**
 - Looking for data quality issues
- **Data Cleansing**
 - Removing poor quality data
- **Data Integration**
 - Combining data from disparate sources

Data Exploration

Goal: Describe and determine need for further data refinement

- **Descriptive Statistics**
 - Discover main characteristics of the data set
- **Data Structuring (Modeling)**
 - Represent the data relationships to meet the analysis requirements

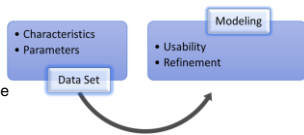


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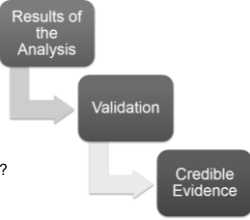
Analyzing Data & Interpreting Results

Goal: Obtain constructive information applied in answering questions, formulating conclusions, predicting outcomes, and supporting decision making

- **Data Mining:** Identify patterns and establish relationships
 - Association
 - Sequence
 - Classification
 - Clustering
 - Forecasting

Analyzing Data & Interpreting Results – Continued

- **Data Segmentation:**
 - Organize the data to facilitate the analysis
 - Enable correct interpretation of data
- **Data Visualization:**
 - Aids in understanding and interpretation
- **Validation of Results:**
 - Did we ask the right question?
 - Were the right questions answered?
 - Did we perform the analysis correctly?



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Reporting

Goal: Communicate key findings of the analysis

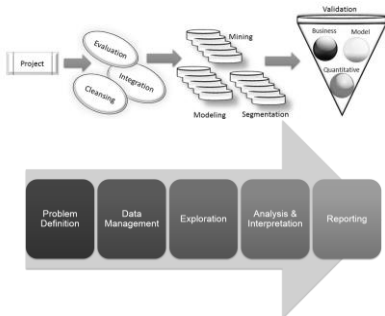
- **Tailored to Audience**
 - Leadership
 - Stakeholder



Image by [Zimbro](#), 2011

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Summary of the Process of Data Analysis



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Summary

Five steps of the data analysis process:

- Problem definition
- Data management
- Exploration
- Analysis and interpretation
- Reporting of results



Data analysts use various tools and techniques:

- Process and clean
- Explore and visualize
- Mine and model
- Analyze and interpret
- Produce reports



Image by Ambro, 2011

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Data Analytics Tools and Techniques References – Lecture a

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Data Analytics Tools and Techniques References – Lecture a – Continued

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