Development of an Advanced Analytics DataMart for Machine Learning, Effectiveness Research, and Population Health Trends

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Disclosure

I have no actual or potential conflict of interest in relation to this presentation.
Objectives

- Introduce Baptist Health South Florida & Center for Advanced Analytics
- Discuss work focus
- Method – Importance on Clinical Context in Data Extraction
- Results – High level view of extraction process from EMR to Actionable Datasets
  
  Validation, validation, validation!

- Conclusion – The Journey Continues
Function:

- Apply clustering and predictive analytics to extract new strategies from our data.
- Identify and predict activities that will optimize clinical, financial and operational processes and outcomes.
- Educate and socialize our findings to senior leadership stakeholders and operational leaders.
Center for Advanced Analytics - Levels of Analytics

**Prescriptive**
- What is the best that can happen or what should we do about it?
- Optimize

**Predictive**
- Foresight
- What will happen next?
- What if these trends continue?
- Forecast
- Predict

**Diagnostic**
- Insight
- Why did this happen?
- Statistical Analysis

**Descriptive**
- Hindsight
- What happened?
- What actions are needed?
- How many, how often, where?
- Where exactly is the problem?

**Sources:** Garnter & SAS, Inc.

**Complexity/Degree of Intelligence**
- Data
- Information
- Knowledge
- Intelligence
Method

- Structured
- Unstructured

Subject Matter Experts
- Centers of Excellence-MOSMI
- Physicians /Nurses
- Engineers
- Scientists

DataMart
- Clinical
- Financial
- Administrative
- Laboratory
- Pharmacy
- Radiology
- Registry
Results

Operational Sources → Data Warehouse → DataMart

DataMart

27 views

Actionable Data
Figure 2. DataMart Source Schema
Figure 1. DataMart Creation Flow Diagram

1. Start
2. Data exist in CAA Data Mart?
   - Yes: Refer to data source / variable identification document. If necessary, contact customer / SME for more information (front end location(s) within EMR(s)).
   - No: DWBI counterpart identifies requested project variables from DWBI source table(s) and shares source information with CAA DM before View(s)/Project Dataset is constructed in DEV. (This process provides CAA with greater awareness of the type of information DWBI has available on a particular category.)
   - CAA may consult with customer & request/define additional variables at this time.
   - DWBI counterpart provides CAA with source table metadata information for further review.
3. DWBI counterpart identifies requested project variables from DWBI source table(s) and shares source information with CAA DM before View(s)/Project Dataset is constructed in DEV. (This process provides CAA with greater awareness of the type of information DWBI has available on a particular category.)
   - CAA may consult with customer & request/define additional variables at this time.
   - DWBI counterpart provides CAA with source table metadata information for further review.
4. Once variables are finalized, Current CAA DEV View(s) are updated with new project variables OR Complete Project View is built on CAA DEV server containing all required project variables.
5. Data View(s) is moved to PROD. Information in View is as current as the information in DWBI (usually 24hr lag).
6. New data is validated against is source to ensure the new data accurately captures the required information. IE: CAA will verify patient orders information on EMR1 front end against orders information in DEV view.
7. CAA DataMart dictionary is updated with new metadata.
8. End Acquisition
9. Start Validation

*Additions to PROD Views are possible, but require a change order and generally take 1 to 2 weeks to process.*
Conclusion

• The methods for creating a data mart could be applied to other healthcare systems.

• Our DataMart has already enabled practitioners to systematically mine and analyze data to develop patient risk profiles, predict hospital readmissions, and perform comparative effectiveness studies.

• We believe harnessing big data will serve as a catalyst to achieve first-in-class, innovative, advanced analytics at Baptist Health South Florida.
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