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

Priscilla Rivera
_Baptist Health South Florida_, PriscillRi@baptisthealth.net

Carlos Valle
_Baptist Health South Florida_, CarlosValle@baptisthealth.net

Lourdes Rojas
_Baptist Health South Florida_, lourdesroja@baptisthealth.net

Chintan Bhatt
_Baptist Health South Florida_, ChintanB@baptisthealth.net

Lisa-Mae Williams
_Baptist Health South Florida_, lisamaesw@baptisthealth.net

See next page for additional authors

Follow this and additional works at: https://scholarlycommons.baptisthealth.net/se-all-publications

Citation
Rivera, Priscilla; Valle, Carlos; Rojas, Lourdes; Bhatt, Chintan; Williams, Lisa-Mae; Parris, Don; Gidel, Louis; and Armaignac, Donna Lee, "Development of an Advanced Analytics DataMart for Machine Learning, Effectiveness Research, and Population Health Trends" (2020). _All Publications_. 3447. https://scholarlycommons.baptisthealth.net/se-all-publications/3447
Authors
Priscilla Rivera, Carlos Valle, Lourdes Rojas, Chintan Bhatt, Lisa-Mae Williams, Don Parris, Louis Gidel, and Donna Lee Armaignac
Development of an Advanced Analytics DataMart for Machine Learning, Effectiveness Research, and Population Health Trends

Presented By Priscilla Rivera, MPH-Informatics
Authors

- Carlos Valle, MSIS, RT
- Lourdes M. Rojas, PhD, MPH
- Chintan B. Bhatt, MBBS, MPH
- Eduardo Martinez DuBouchet, MD
- Lisa-Mae Williams, CCRN-K, PhD, RN
- Don Parris, PhD, MPH
- Louis Gidel, MD, PhD, FCCP
- Donna Lee Armaignac, PhD, APRN CCNS CCRN-K
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?
- Predict
- What if these trends continue?
- Forecast

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

**Descriptive**
- Hindsight
- What happened?
- Ad hoc reports
- OLAP
- Alerts

Sources: Garnter & SAS, Inc.
Method

- Structured
- Unstructured

DataMart

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

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

Operational Sources -> Data Warehouse -> DataMart

- 27 views
- Actionable Data
Figure 2. DataMart Source Schema

- BHSF Input sources
- DWBI Dev DataMart Phase I
- DWBI Prod DataMart Phase II
- CAA DataMart

EMR1
EMR2
EMR3

Validate Data

EMR1
EMR2
EMR3

PROD Output
Figure 1. DataMart Creation Flow Diagram

- DM If appropriate, ‘Walk the floor’ with customer to identify data locations w/in EMR1
- DM/ Bio Stat - Determine minimum set of variables required to satisfy project requirements
- DM/ Bio Stat - Determine variable format(s) & dataset parameters (ETL requirements)
- DM Identify required variables within CAA Data Mart using ‘CAA data bridge’ tool

Yes

- Data exist in CAA Data Mart

No

- Refer to data source / variable identification document
  - If necessary, contact customer / SME for more information (front end location(s) within EMR1)

- 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.

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

Data View(s) is moved to PRD. Information in View is as current as the information in DWBI (usually 24hr lag). *

*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.
Contact Information

Carlos Valle, MISIS, RT – Data Manager
Email: CarlosValle@baptisthealth.net

Priscilla Rivera, MPH – Data Informaticist
Email: PriscillRi@baptisthealth.net
Valle, Carlos; Rojas, Lourdes; Bhatt, Chintan; Martinez-DuBouchet, Eduardo; Williams, Lisa-Mae; Parris, Don; Gidel, Louis; and Armaignac, Donna Lee, "Development of an Advanced Analytics DataMart for Machine Learning, Effectiveness Research, and Population Health Trends" (2019). All Publications. 3330. https://scholarlycommons.baptisthealth.net/se-all-publications/3330