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

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

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Background

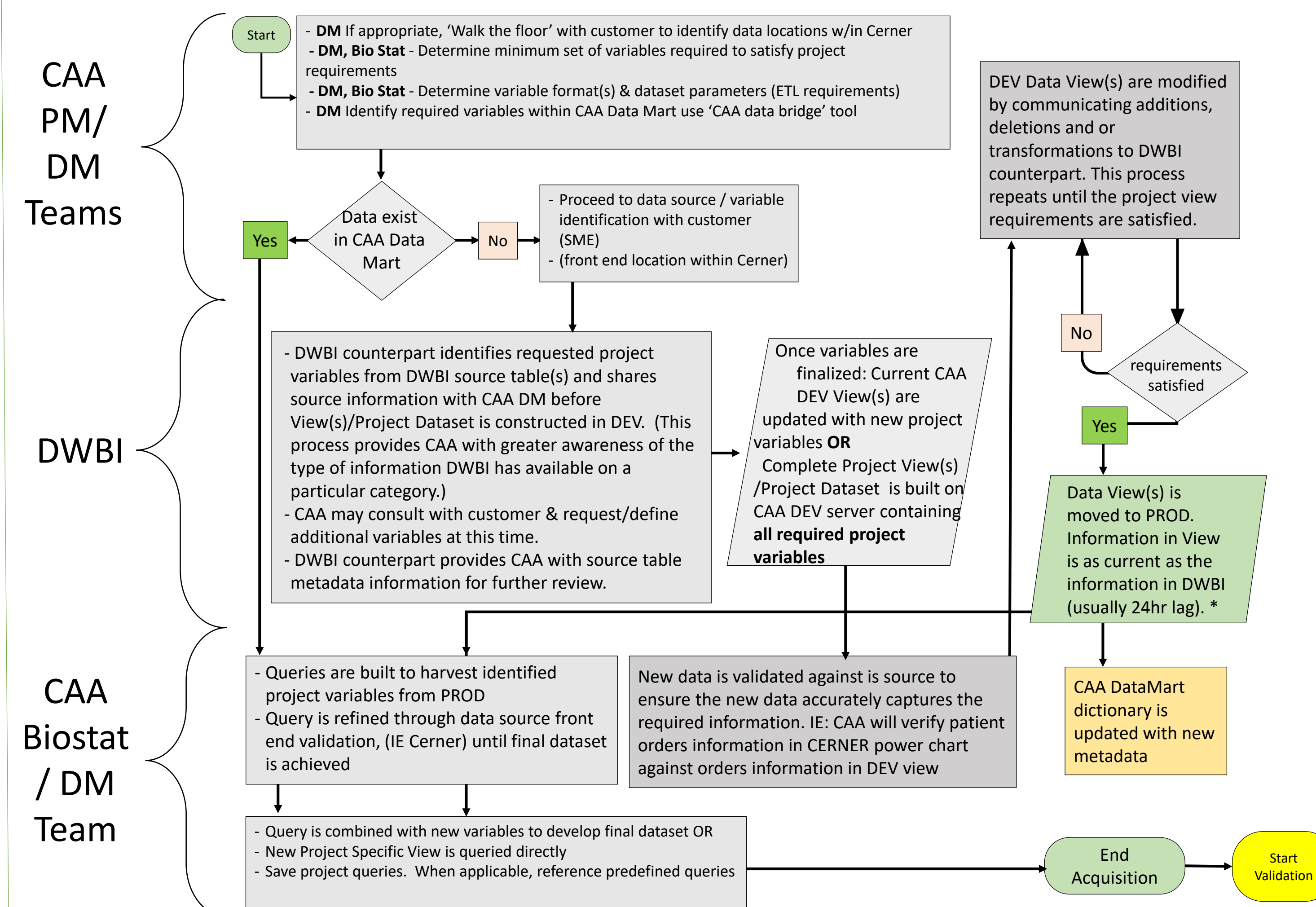
- Advanced analytics applied to big healthcare data enables prediction of patient risk, enhances system performance, and reduces costs.
- Yet, big data remains largely untapped in healthcare systems, with the major limitation of healthcare information captured in disparate systems.
- The requisite first step to advanced analytics is accurate, centralized data. Thus, the Center for Advanced Analytics (CAA) at Baptist Health South Florida (BHSF) created a DataMart to facilitate the data extraction and transformation required for predictive analytics.
 - BHSF is the largest, not-for-profit health system in South Florida, with 11 hospital entities and over 100 outpatient centers



Method

- An interdisciplinary team of physicians, nurses, engineers, scientists, and subject matter experts developed the DataMart.
- Structured and unstructured data from disparate sources, were integrated into one centralized repository.
 - The DataMart was designed to include clinical data, financial and administrative systems, clinical trial management systems, registries, biospecimen laboratory, microbiology, pathology, pharmacy, radiology, and synoptic reports and archives.
- The DataMart was established to connect to business intelligence and statistical tools, and has been cross validated with clinicians' views to ensure that our queries capture the relevant information of the patient experience.

Results



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

Figure 1. DataMart Creation Flow Diagram

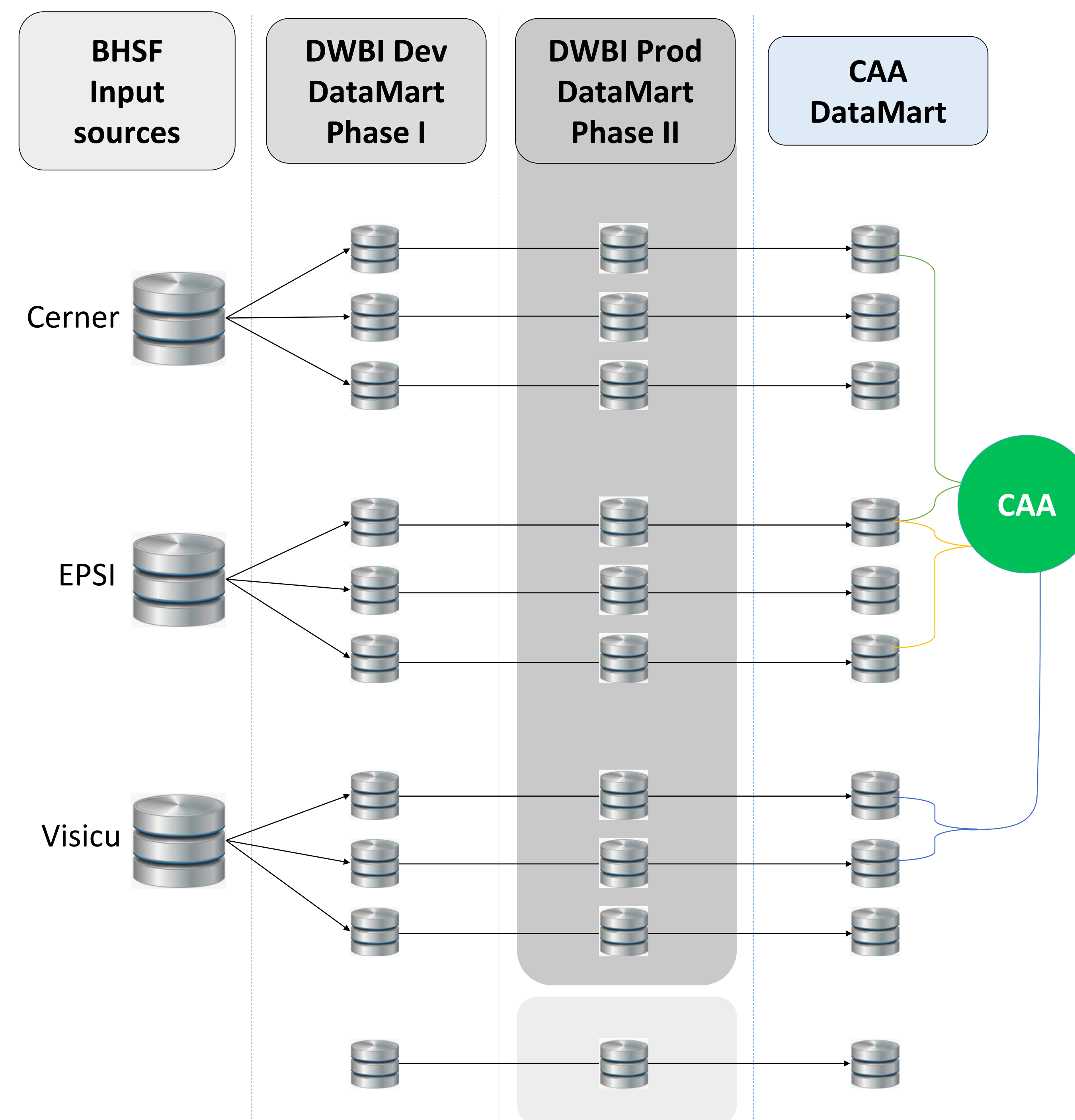


Figure 2. DataMart Source Schema

Results

- The DataMart consists of 25 views linked to source tables in Data Warehousing Business Intelligence (DWBI) and archive database (archiveDB).
- Each view is linked to a source table in the Data Warehouse that is linked to its corresponding output table in the electronic medical record.
- Our data is not altered or transformed by DWBI processes that may occur downstream, allowing data to reflect what the clinicians enter into the system.
- In the next phase, we will set up a constellation schema where several dimensional tables are linked to a few transactional tables to simplify the data extraction process.

Conclusions

- 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

- Please contact Carlos Valle, Data Manager at the Center for Advanced Analytics, for more information. Opportunities may be available for interested students with big data skill sets:
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