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5 Reasons BI Tools Can't Work as a Healthcare Enterprise Data Warehouse

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> " The power of visualizations comes not only from using them to transform but the foundational process of their creation, if created using a team approach that involves clinical, administrative, and technical members. "

If you have spent much time reading the commentaries on our site, you know that a healthcare enterprise data warehouse (EDW) is the only viable solution for health systems and physician groups looking to use analytics to drive sustainable quality and cost improvements across the enterprise. In fact, Level 1 of the Healthcare Analytics Adoption Model (http://www. healthcatalyst.com/healthcare-analytics-adoption-model/) is implementing an EDW.

A lot of other vendors have also recognized this fact, and so today there are many business intelligence (BI) tools and visualization solutions that market themselves as cloud data warehouses—offering quick analysis and flexible visualizations in a user-friendly package. These frontend tools have put their toes into the EDW market by incorporating as many data transformation functions on the backend as they can.

However, a variety of data transformation capabilities does not an EDW make. The truth is that these solutions do not measure up to a real healthcare EDW.

What Healthcare Business Intelligence Tools Do Very Well

These frontend BI tools do a fabulous job of visualizing data and exposing it to end users. That is their core strength (http://www.healthcatalyst.com/ healthcare-visualization-benefits). They are essentially reporting tools that visualize data to represent a snapshot of information captured at a particular point in time. They offer different types of visualization tools (http://www.healthcatalyst.com/Evaluating-Business-Intelligence-Tool-for-Healthcare), and some even give you the ability to design your own dashboards. The more sophisticated visualizations also enable a certain level of drilldown into the data.

Another strength of these tools is their ability to make visualizations securely available wherever users want to access them. Making visualizations accessible anywhere, anytime via the Internet is obviously a convenient way to expose data to users.

Why Healthcare Business Intelligence Tools and Visualization Solutions Do Not Work as a Healthcare Enterprise Data Warehouse

No matter how slick a visualization is, no matter how easy it is for users to access the visualization, it is of no use to anyone if it is not based on a robust data foundation. It is in handling the data sets—really creating and managing data in an EDW—where these BI tools fall short.

Here are 5 things a healthcare BI tool cannot do:

1. Optimize the healthcare data

Anyone who has undertaken a data warehousing project invariably experiences a rude awakening: Aggregating data from source systems uncovers a slew of data quality issues. In fact, optimizing data and exposing data quality issues represents a significant chunk of the effort in the initial stages of an EDW project. Resolving data quality issues requires quite a bit of human interaction with the data, and this is only done effectively by making the data available in a data warehouse. The need to delve into the database to optimize data and continue work on resolving data quality issues will not go away after the initial EDW implementation. Database administrators, data architects, and others will need to access the database and make these kinds of adjustments on a go-forward basis—when creating a dashboard, refining a process improvement initiative, or moving on to a new initiative.

2. Handle large amounts of healthcare data

BI tools attempting to function as data warehouses simply do not have the processing power or sophistication to deal with the massive quantities of data a health system produces. Just think: One patient encounter alone can generate hundreds of rows of data in a hospital database. Multiply that by thousands of patient visits, and you end up with millions and even billions of rows of data. A small, independent hospital might be able to get by with running a BI visualization tool against its EHR database, but a medium-sized hospital or even a health system with two small hospitals could not. BI tools used as data warehouses simply do not scale.

3. Work with healthcare data at different levels of granularity

Many BI tools cannot handle data at different levels of granularity. In data warehousing, granularity refers to the level at which data is stored or displayed, and also how it relates to other data. For example, one database list might store patients and another list might store patient encounters. The lists have a one-to-many relationship (since one patient can have many encounters). In terms of granularity, we would say that the patient encounter list is at a more detailed grain. In a BI tool, a common way of showing this might be a report header (showing a patient's summary information) with multiple

encounters showing in a detailed list. This dealing with one-to-many and many-to-many relationships in the data requires a sophisticated system, especially when you are dealing with millions of rows of data. How well your data warehouse handles granularity is very important for analysis and system performance. Many BI tools have a difficult time accurately associating and displaying these different grains in a way that is intuitive and easy-to-use. Some BI and visualization tools are better than others at working with data at different grains.

4. Optimize healthcare data for multiple user types.

Imagine you are able to get all of your data optimized and loaded into your data warehouse. Now that you have the data you need, many different audiences are going to have questions they want that data to answer. A data architect, an executive, a nursing manager, a clinician, a person responsible for regulatory reporting, each is looking for a different insight from the same data. Applying all of the logic against the data that makes it understandable at multiple levels for different audiences is something BI tools simply cannot do. By using a true EDW, you can pull the data and build subject-specific data marts to answer these questions. And, in the process of doing so, you engage these different audiences, exposing them to your methodology and helping them understand the data and their own processes even better.

5. Provide for modularity, understandability, and code reuse.

A BI tool limits the ability to reuse SQL code and logic. One data architect might maintain the SQL for six months, and then another might need to learn it and further maintain it for the next six months. Unlike a BI tool, a well-designed data warehouse includes sets of logical SQL views that work well in stand-alone sets (e.g. two or three SQL files that, combined, show a population with hospital-acquired pneumonia and specific metrics for that population, such as readmission rate). Since the SQL views are stand-alone (and not bound to the particular BI tool), they can be more easily (and inexpensively) reused elsewhere in the organization at a relatively low incremental cost, without having to keep the logic in distributed desktop files. The data warehouse not only stores a central repository of data, but it also stores centralized logic. A further benefit of this approach is understandability of the code and transfer of knowledge. Data architects need to understand the reasoning of why SQL code was written a certain way to understand how to maintain a particular data mart or to reuse the logic in another data mart. Centralized logic and code support this goal.

There is no getting around it: data-driven healthcare transformation (http://www.healthcatalyst.com/healthcare-business-intelligence-smarter-decisions) requires an EDW. The shortcuts BI tools offer will prove insufficient.