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A White Paper

Where the EHR Stops and Analytics Begins

How providers can thrive with Enterprise Analytics

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Introduction

Healthcare organizations rely on electronic health records (EHR) vendors to provide the technologies that support their clinical and administrative workflows. Should they also rely on these same vendors for enterprise data management, reporting, and analytics solutions?

This paper will help healthcare decision makers choose their strategic direction for data management and analytics technology. It identifies the data and analytics requirements for running a healthcare enterprise – specifically, accessing data, managing data, preparing data for analysis, and using analytical insights to improve performance and population health.

This paper shows that data management and analytical solutions supplied by an EHR vendor are generally insufficient for delivering the breadth of enterprise insights required to thrive in healthcare. Therefore, EHR vendor reporting solutions, while valuable for the purpose they serve, are not suitable as a foundation for Enterprise Healthcare Analytics.

The keystone technologies must broadly support requirements spanning data types, data management capabilities, and analytic methods; and must include pre-built applications for specific use cases. An EHR vendor's reporting solution has some overlap with an enterprise healthcare analytics platform, but it is not a substitute.

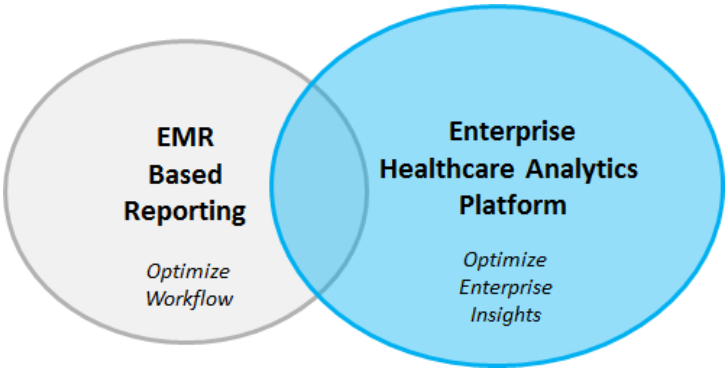

Figure 1.0 – Confluence of Data Analytics Technology Approaches

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Key Trends Driving the Need for Better Data and Analytics

The shift to value-based care and consumerism, coupled with technology and data science advances, has created an opportunity for healthcare organizations to deliver care that is more accessible, evidence-based and cost-effective. But providers must accomplish this goal while delivering a positive contribution to the bottom line, because if there is no margin there is no mission.

Competition for market share has never been greater, as healthcare providers seek to scale as a means of driving profitable growth. But scale in of itself does not guarantee quality, efficiency or profitability.

As pressure mounts to deliver more value at a lower cost, better data insights are required to manage risk and focus performance improvement efforts. Data insights will empower providers to:

- Identify patients who need care
- Identify high risk patients for care management
- Identify patients for outreach
- Uncover quality improvement opportunities
- Identify cost reduction opportunities
- Select new care locations
- Proactively detect fraud and abuse
- Succeed under value-based care
- Identify revenue and market share growth opportunities

Moreover, complexity is further exacerbated by the convergence of provider and payer data currently used to measure healthcare. Providers must perform a balancing act with different data sources based on varying data access & timeliness, completeness, and clinical richness.

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Healthcare Has Underinvested in Data Analytics

A key challenge is that the healthcare industry has not yet made a significant investment in data analysis. A May 2017 article in The New England Journal of Medicine Catalyst (May 2017) states, "As much as 30% of the entire world's stored data is generated in the health care industry …This trove of data has obvious clinical, financial, and operational value for the health care industry, and the new value pathways that such data could enable have been estimated by McKinsey to be worth more than $300 billion annually in reduced costs alone.

However, we believe that the health care industry does not currently appreciate the inherent value of these data, which can only be fully harnessed through better data analytics… If appropriate investments in data science are not made in-house, then hospitals and health systems will run the risk of becoming reliant on outsiders….to inform decisions and drive innovation."[1]

At a minimum, healthcare providers should recognize that significant reimbursement penalties and incentive payments are on the table. A material improvement to the bottom line can be realized by avoiding these penalties and securing incentive payments.

But an even larger opportunity is to expand market share and reach by using data to clearly demonstrate value to all stakeholders and to create a superior patient experience that attracts and retains loyal healthcare consumers. Data insights can be used for everything from modeling populations for new opportunities to choosing new care locations to personalizing patient engagement.

[1] Huesch, Marco D.; Mosher, Timothy J. "Using It or Losing It? The Case for Data Scientists Inside Healthcare," New England Journal of Medicine, May 2017

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Data Liquidity Enables Organizational Agility

Data liquidity is the ability to provide the right data to the right person at the right time and place. Sound data management and analytics practices are integral to data liquidity. Figure 2 depicts the enterprise value chain for data management and analytics necessary to establish data liquidity.

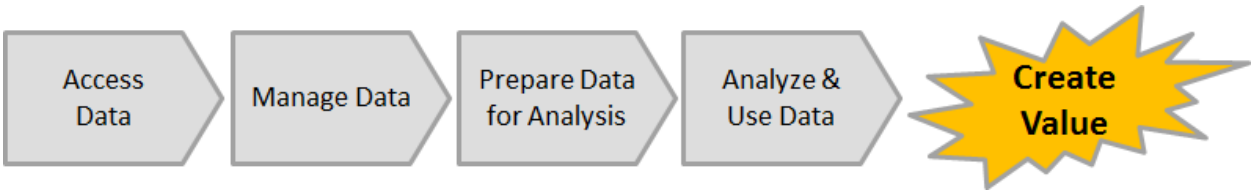

Figure 2.0: Data Liquidity Value Chain

An enterprise healthcare analytics platform supports each step in the value chain.

- **Access Data:** The ability to access many data types and sources, in the frequency required, using the most appropriate technical approach.
- **Manage Data:** The ability to integrate and harmonize data sources, create golden master records, enrich data, measure data quality and maintain metadata.
- **Prepare Data for Analysis:** The ability to organize data and apply algorithms to further prepare it for analysis. Examples of data preparation algorithms include PCP attribution, patient quality indicators, geo-models, cohort creation, episodic grouping, and risk scoring.
- **Analyze Data / Use Results:** The ability to get data insights into the hands of users to support specific use cases.

An enterprise healthcare analytics platform comes with core data management and analytics tools, healthcare data and analytical models, and built for purpose healthcare apps. Additional capabilities can be added as needed.

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False Expectations That EHR Vendors Can Address All Data Needs

In recent years, there has been great focus on implementing new electronic health records systems. The market for electronic health records (EHR) reached $28 billion in 2016 and is expected to grow to approximately $36 billion by 2021.[2]

Automating healthcare processes has led to many improvements. But while ideal for supporting clinical and administrative workflows, EHRs were not designed to capture, manage, and analyze all the data needed to run a healthcare enterprise or improve population health.

However, EHR vendors encourage customers to rely on their solutions for data management and analytics. This has raised false expectations with decision makers, who are led to assume that their EHR vendor will satisfy most of their data needs - if not now, then within two to three years. Customers who have made a substantial commitment to their EHR vendor want to believe that their data needs will be addressed through that relationship, but that assumption is flawed.

[2] https://www.kaloramainformation.com/Content/Blog/2017/06/05/6-Predictions-for-The-2017-EHR-Market

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Where the EHR Stops and Analytics Begins

There are several fundamental reasons an EHR can't do it all. These reasons are listed in the EHR Vendor Data/Analytics Limitations Table below, and further explained in subsequent sections of this paper.

Data Analytics Capability	Typical EHR Limitation
Access Data	**An EHR does not have all of the data needed to run a healthcare enterprise.** EHR vendors generally focus most of their data capabilities around their own data. Yet that is only a fraction of the data needed to manage a healthcare enterprise.
Manage Data	**Data management is not an EHR vendor's core competency.** EHR vendors do not provide robust data management capabilities.
Prepare Data for Analysis	**Analytical modeling is not an EHR vendor's core competency.** EHR vendors do not provide a full set of tools or methods to prepare data for analysis.
Analyze & Use Data	**EHR vendors do not support the full range of healthcare use cases.** Based on their data source limitations, EHR vendors generally focus on data uses that leverage their own EHR data. Furthermore, they do not yet support many advanced analytics use cases, even with their own data.

Table 1.0 EHR Vendor Data/Analytics Limitations

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An EHR Does Not Have All Data Needed to Run a Healthcare Enterprise

Integrated data from many sources is required to manage a healthcare enterprise. The EHR is the primary source for encounter-based clinical, revenue cycle, and operational data for the care delivered within a healthcare organization. EHRs contain a lot of data, but not all necessary data as depicted in Figure 3.

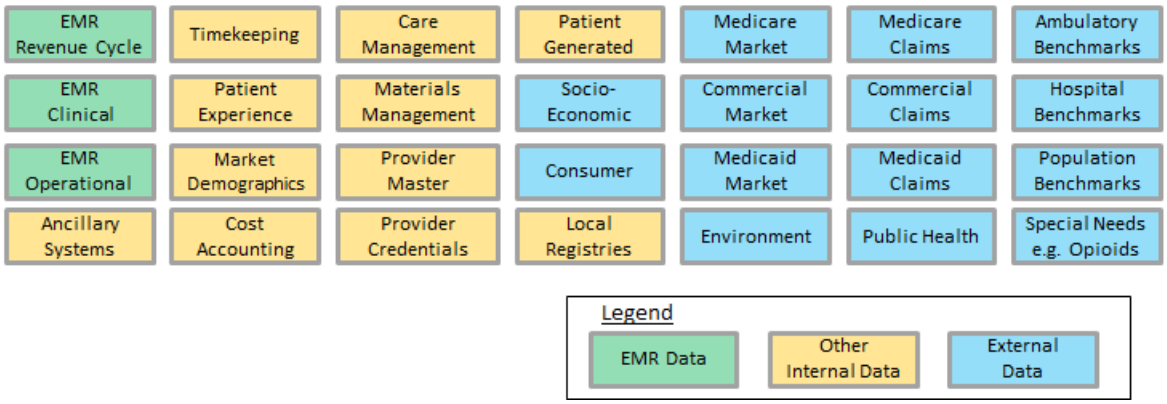

Figure 3.0: Healthcare Data Requirements

Most of the depicted data sources are not supported by EHR reporting capabilities. For example, healthcare organizations need to monitor provider credentials, group practice affiliations and contact information. Ensuring the accuracy of this data has regulatory, legal, patient care, provider satisfaction and performance measurement implications. EHR systems are notoriously limited in their ability to help maintain accurate provider data or support the full range of provider-based reporting and analysis required.

Healthcare systems also need to understand where patients received out-of-network care. Medical and pharmacy claims are a valuable data source for seeing the total care picture; and are required for managing risk-based contracts where a provider is held financially accountable for all care a patient receives.

Furthermore, healthcare is coming to grips with social determinants that impact patient health. As providers take on more risk, they need new insights to personalize interventions for addressable risk factors and to quantify risk when negotiating risk-based contracts. Some healthcare organizations are starting to gain experience in this area - for example, by utilizing new data to better understand education levels, crime rates and other social determinants of health to tailor interventions.

A final example involves mergers. When two health systems merge, it can take several years before their EHR systems are consolidated. However, the right data platform can

integrate data for analysis and reporting in less than 6 months post-merger, to support the realization of post-merger synergies.

As healthcare providers recognize the need for analytics across many data sources, they are coming to realize that the reporting solutions supplied by their EHR vendor contain only a fraction of the required data. An enterprise healthcare analytics solution needs to be flexible enough to integrate a wide variety of data, and agile enough to add new data sources as needed.

Furthermore, the methods for accessing data should be flexible, ranging from real-time application interfaces to scheduled bulk data loads and external web services.

Data Management is Not an EHR Vendor's Core Competency

For most end users, data management is something that just happens behind the scenes. Most healthcare leaders and end users are not generally exposed to the data engineering required to establish a foundation of good data for analysis. Figure 4 depicts required data management capabilities.

Figure 4: Data Management Capabilities

When it comes to data management, organizations must commit to doing what it takes to make data work, or deal with data frozen in a state that is difficult to use.

EHR vendors' core competency is to support clinical and administrative workflows. They do not have a long history of R&D investment in data management and analytics. Therefore, their capabilities often fall short. For example, EHR vendor solutions typically do not include the functionality needed to:

- Add and integrate new data sources
- Link patients across many data sources including both EHR and non-EHR systems
- Create golden master records for providers, patients, and payers

- Harmonize hundreds of reference codes across difference data sources
- Geo-code addresses for geo-spatial analysis
- Use standard medical vocabularies, taxonomies and code sets to improve search and group related medical concepts (e.g. drug class, related medical conditions, etc.)
- Monitor data quality with tools that help data stewards correct data problems
- Profile populations and volumes with alerts of statistically significant trends
- Provide sufficient data about the data (i.e. metadata), so that data is easy to find, understand, and use appropriately

Analytical Modeling is Not an EHR Vendor's Core Competency

Analytical modeling in healthcare is a rapidly expanding discipline. There are an infinite number of ways data can be analyzed. Analytical models make it possible to generate unique insights and improve the speed of analytics. Figure 5 below depicts common analytical modeling capabilities.

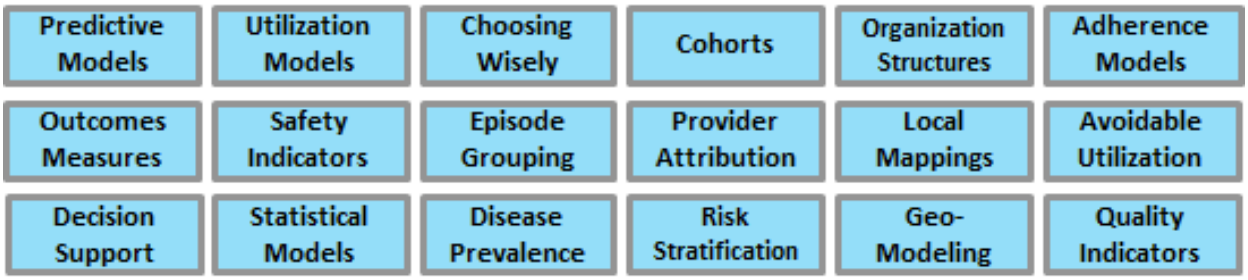

Figure 5: Preparing Data for Analysis – Analytical Modeling

Historically, EHR vendors have offered libraries of pre-built reports that run directly against copies of their own EHR data. These reports are useful to support operational reporting that requires only their EHR data, and does not involve additional analytical modeling. EHR vendors are slowly starting to add more advanced analytical models, but often use proprietary approaches that make it more difficult to work with third-party algorithms and analytical solutions.

Similar to data management, healthcare organizations need a solution that comes pre-loaded with a wide range of analytical models, with the ability to add customer-built, third-party and open source models. Enterprise healthcare analytics solutions serve to consolidate analytical modeling best practices, while at the same time enabling individual organizations to learn and innovate by experimenting with new models.

EHR Vendors Do Not Support the Full Range of Healthcare Use Cases and Delivery Methods

The final step in achieving data liquidity is getting the right data to the right end user at the right point of use. In today's technology environment, data insights can be delivered in many ways. And there are hundreds of potential end-user applications for data insights. Figure 6 depicts broadly-defined categories of use cases.

Figure 6: Use Case Categories

There are countless healthcare use cases that won't be described here. But one universal truth is that data should be organized and accessible in a way that it can be used many times for different purposes. Too often disparate reporting systems emerge resulting in a fragmented approach prone in inefficiency and inconsistent views of data.

Leading enterprise healthcare analytics platforms should come with built-for-purpose apps and other tools to support a range of use-cases. The technology should offer flexible ways to deliver insights to end users, including the following:

- **Built-for-purpose information applications:** Examples of built for purpose applications include performance scorecards for hospitals, departments, practices, service lines, and physicians that enable top-line performance, with the ability to drill down to individual patients and encounters. It can also include population health management tools for Clinically Integrated Networks, ACOs, and Care Management organizations.

- **Ad-hoc reporting and data exploration:** Self-service tools that will empower data analysts to conduct their own analyses.

- **Outbound feeds to operational systems:** Examples include sending lists of patients to a care management system, an automated patient scheduling system, or a targeted marketing system based on specific cohort criteria and/or triggering events.

- **Automated report distribution and trend alerts:** Automatic notifications sent to users of new reports or important trends.
- **Point-of-care integration**: Provides insights to the EHR using integrated data. For example, patient risk stratification including risk scoring and key attributes such as a patient medication adherence can be sent directly to the EHR.

- **Advanced analytics:** Provides utilities to build and run statistics, predictive models and other advanced analytics. Often the output of these models is made available to the end user by embedding a model into one of the other approaches on this list.

It is critical for any enterprise healthcare analytics solution to be flexible enough to support a wide range of data uses and delivery mechanisms.

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Conclusion

Effective use of insights from data is the key to success in an increasingly complex healthcare environment and data-driven economy. Healthcare organizations need an enterprise healthcare analytics platform that can broadly support analytics requirements spanning data types, data management capabilities, analytic methods, and applications for specific use cases.

Reporting solutions supplied by EHR vendors have a role to fill; but are generally insufficient and should not be the keystone technology behind an enterprise data management and analytics strategy.

To learn more about choosing the right healthcare analytics platform for your organization, contact Dan Foltz at danfoltz@parnassusconsulting.com