Perspective: Health Catalyst — A Fresh Approach and Architecture for Clinical Analytics

IN THIS PERSPECTIVE

This IDC Health Insights Perspective discusses Health Catalyst's tools for clinical analytics. With the transition from fee-for-service medicine to accountable care, U.S. healthcare providers face a challenging business environment. At the same time, as business models are changing, providers are implementing electronic health records (EHRs) for clinical documentation. Electronic documentation tools not only promise to offer more data and insight into clinical operations via analytics but also add to the amount of disruption providers face. With so much in flux, keeping track of operations is difficult, and there is a growing need for complex but agile and actionable analytics tools to help providers maintain profitability and stay competitive. Most providers have found themselves handicapped by the lack of capabilities in the analytics tools embedded in their clinical applications, so third-party analytics offerings increasingly play a role in giving providers the insight to make actionable business decisions and prepare for accountable care, and standalone analytics represents one of the fastest-growing areas of provider IT spending. Clinical analytics vendor Health Catalyst has created new approaches to building, managing, and operating the clinical data warehouse (CDW) environment that has created opportunities for providers to harness data, make actionable interventions, and improve profitability.

Situation Overview

Health Catalyst (formerly Healthcare Quality Catalyst) (www.hqcatalyst.com) is a privately held company founded in 2008 and headquartered in Salt Lake City, Utah. With 74 health system clients, Catalyst is one of the fastest-growing analytics and clinical data warehousing vendors in the provider space and reported 1,100% year-over-year growth in August 2012 (www.hqcatalyst.businesscatalyst.com/announcements/healthcare-quality-catalysts-strong-momentum-in-the-first-half-of-2012-validates-companys-market-lea). Catalyst's unique approach to the CDW, rapid implementation, and structured, actionable analytics differentiate the company from its competitors. The focus of Catalyst's
analytics is on providing operational financial and clinical reporting that helps identify waste in healthcare systems and target the largest opportunities for outcome enhancement as a result of interventions. Key reference accounts for Catalyst include Allina Health, Providence Health & Services, Indiana University Health, Stanford Hospital & Clinics, and Texas Children's Hospital.

**Approach to CDW**

CDWs have long been a challenge for providers to implement and maintain. A significant portion of clinical documentation is by nature unstructured, and this has thwarted efforts by providers to optimize the highly structured data warehouses common to other industries. Clinical data is also extensive, inconsistent, and multidimensional; different types of analysis, such as population-based or episode-based analysis, rely on different dimensions for data models but often are called upon in the same analytics environment, creating issues for warehouse designers working with rigid schemas. Catalyst has employed bus architecture in its data warehouse that emphasizes late binding of data to build in agility that the company claims allows the data model to support the multiple use cases required for clinical analytics. The technology is based on the company's founders' experience at Utah's Intermountain Healthcare, where the approach has been in place since 1994.

Catalyst's data warehouse uses the Microsoft SQL DBMS, and the warehouse and analytics tools are installed at client sites and not currently offered in hosted or service-based options. Purchasing Catalyst involves an investment in the core data warehouse plus an additional charge for data marts that the company organizes into two groups:

- Source data marts are accelerators (prebuilt integrations) to incorporate source data into the data warehouse.
- Subject-area data marts are subsets of data specific to the prioritized areas of care improvement that a hospital defines.

The data marts contain rules for waste identification in specific clinical programs and diseases, as well as accelerators (prebuilt integrations) for specific source systems. Pricing of the warehouse and subject data marts is based on bed size, with additional charges for integration with each source system and each subject data mart. Preconfigured accelerators exist for common source systems from vendors such as Epic, Cerner, PeopleSoft, EPSi, Press Ganey, and Lawson, among others. Catalyst claims pricing at all of its installations ranges between 3% and 5% of the site's EHR investment. With roots in the nonprofit Intermountain Healthcare, SVP Dale Sanders claims that "Health Catalyst is focused on keeping the product affordable for providers and
expects most health systems to realize a 5–10 times return on their data warehouse investment."

A services engagement is required for building the data warehouse, and the shortest implementation time frame Catalyst cites for the implementation of a basic warehouse (integrating three source systems and two subject data marts) has been seven weeks, although implementation times have varied across customers. Catalyst places an emphasis on self-service, and its service organization participates closely in initial analytics projects with clients while training staff at client sites to run subsequent projects. Approximately 70% of Catalyst's income is derived from the firm's technology and 30% from services. There is a defined process for Catalyst to handle an initial project, for the next project to be shared by both Catalyst and client and then for client to shoulder the majority of the burden to execute a project until finally, the client is self-sufficient. Health Catalyst gives clients access to the source code.

**The Analytics**

Catalyst provides its customers with multiple levels of analytics; customers work up through an analytics maturity model from simple reporting to complex waste reduction tools provided by the vendor. The data warehouse provides internal reporting as well as external reporting for population registries. The waste reduction tools focus on three areas of clinical practice that result in waste:

- **Ordering.** Ordering analytics look at physician practices when ordering tests and services, focusing on identifying those that are excessive, not diagnostic, or don't contribute to the management of a condition. Identifying and targeting ordering waste is particularly important to hospitals moving from fee-for-service to value-based and capitated business models.

- **Workflow.** Workflow analytics examine opportunities to streamline workflow and increase the velocity of decision making and care delivery, thereby improving outcomes and reducing expenses. Identifying and correcting workflow inefficiency directly enhance profitability for hospitals operating under value-based payment models.

- **Defects.** Defect analytics scrutinize clinical care issues that result in lesser outcomes for patients and excess cost for the health system, such as preventable adverse events like medication errors and pressure sores. Many of the care defects that result in preventable adverse events lead to unreimbursed services under current payment practices, and with increasing emphasis on outcomes and value-based reimbursement, reducing care defects will only become more critical to providers in the future.
Analytics results are delivered to customers in reports and graphical formats, with eye-catching charts and graphs that help customers prioritize the areas of care that represent the largest opportunities for improving outcomes, and highlight specific measures for improvement. The approach is interesting; the care processes examined include not only the chronic diseases typically targeted for outcomes improvement programs but also procedure-specific clinical programs, which Catalyst's analytics have determined house easily accessible opportunities for waste reduction, such as reducing central line–associated blood stream infection (CLABSI), reducing heart failure readmissions, and reducing elective inductions for pre-39-week gestational age deliveries. Catalyst works with clients to prioritize waste reduction projects using an ROI impact analysis that takes the payer mix into account, supporting the transition to accountable care by allowing end users to consider opportunities differently under fee-for-service, per-diem, per-case, condition-capitation, and full-capitation models. Waste reduction examples get specific, indicating to providers those tests that must be ordered, tests to consider, and tests that are wasteful. The *British Medical Journal* and National Library of Medicine are the basis of clinical content for rules used in the analytics.

Figure 1 shows a Catalyst graphic of a variable direct cost pareto by care process family.
The Approach

In its quest to make the analytics actionable, Catalyst delivers analytics findings to physicians in multiple steps:

- **Data exploration.** Allow providers to view the data themselves, drill down into details, and examine variation between physicians. Show providers the data visualization tools and examine the cohort to launch the project.

- **Care process format.** The interventions are laid out in a care process model that identifies where the greatest variations in care delivery lie, and allows physicians to understand problems and propose solutions themselves, in the context of how they work.

- **Create a starter set of goals for improvement.** Offer the organization a starter set, including a particular patient cohort, condition, and interventions to be targeted. Recommended
interventions are specific, with an emphasis on exactly which ICD codes and orders to target.

- **Aim statement.** Target goals that set out to improve a specific metric by a proscribed date. Goals include both the target measure and the timelines.

- **Statistical process control maps.** Measuring tools are used to measure the improvements as progress is made.

- **Move on to what's next.** As goals are achieved, providers see results and work proactively to identify the next targets for improvement and select subsequent aim statements.

With an actionable approach and strong tools, Catalyst works with clients to quickly implement analytics, minimize complexity, and provide the tools needed to get results. The differentiators to Catalyst's approach include:

- Adaptive approach to data modeling with a focus on late-binding data

- A clinical improvement methodology that rapidly engages clinical teams with their data, resulting in quick improvements

- Dual targeting of both measures that are likely to bring financial results quickly alongside typical chronic disease care improvements that will improve outcomes and lower costs for the health system in the long run

The Catalyst approach is particularly well suited to the nascent accountable delivery network, where short-term, sustained profitability under changing payment models is critical, while the long-term goals for accountable care are in progress.

**Considerations**

While Catalyst's product offers a compelling value proposition, novel approach, and competitive pricing, growing demand for and provider spending on enterprise analytics has resulted in plenty of options for providers selecting clinical analytics tools. Clinical analytics tools are offered by enterprise HIS and EHR vendors via both embedded reporting and analytics and add-on and partner-supplied modules. Enterprise vendors offering clinical analytics solutions include Oracle's HTB product, Business Objects, IBM's Cognos as well as custom IBM solutions, and others. Specialty vendors with offerings in the clinical waste analytics space include UnitedHealth Group's Optum Insights, Caradigm (GE/Microsoft joint venture), and Truven Health.
Essential Guidance for Providers

Essential guidance for healthcare providers making investments in clinical analytics includes:

- Be clear on your accountable care road map and analytics strategy before any technology decisions are made. There are varying degrees of sophistication of supplier offerings; organizations do not want to over- or underpurchase analytics functionality. Be realistic about your organization's degree of need and ability to leverage findings from analytics efforts in the organization's operations.

- Check with existing HIS and EHR suppliers to understand their analytics offerings. Embedded analytics and analytics modules available and supported by existing vendors may meet some or all analytics needs, at least in the early stages of transitioning to accountable care. While most accountable care leaders will need a more robust analytics platform to succeed under accountable care, many organizations that plan to join existing accountable delivery networks will be able to source analytics via the network as a service, or from the HIE.

- Consider accessing analytics from the cloud. Accountable care requires heterogeneity in healthcare organizations' application portfolios, and service-based offerings will help organizations to be both agile and prepared to accommodate current and future needs.

- Be sure the analytics supplier has domain expertise on clinical processes and workflows as many analytics suppliers that serve multiple industries will offer varying degrees of healthcare expertise in their analytics offerings and the teams that deliver them. The skill and experience of the service team is critical to driving actionable approaches and leveraging analytics in the organization.

- Test potential suppliers' analytics strategy and their commitment to this emerging market. For some, it may seem like a great new opportunity, but they may not have the staying power and technology road map for a long-term commitment.

Learn More

Related Research

- U.S. Health Industry Provider 2013 Top 10 Predictions: Providers Move into New Business Models While Meaningful Use Adoption Continues (IDC Health Insights #HI238411, December 2012)
• U.S. Connected Health IT 2013 Top 10 Predictions: The Consumer Takes Center Stage (IDC Health Insights #HI238619, December 2012)

• U.S. Accountable Care 2013 Top 10 Predictions: Accountable Care IT Strategies, a Period of Maturity Ahead (IDC Health Insights #HI238485, December 2012)

• Business Strategy: The Accountable Care Application Portfolio (IDC Health Insights #HI235377, June 2012)


• IDC MarketScape: U.S. Ambulatory EMR/EHR for Midsize and Large Practices 2011 Vendor Assessment (IDC Health Insights #HI230719, November 2011)

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