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Texas Children's Hospital & Catalyst

An Enterprise Data Warehouse and Advanced Analytics Prove Critical
to Improving Quality at Texas Children's Hospital

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Texas Children's Hospital is internationally renowned for caring for children in the United States and in other countries. US News & World Report ranked it the nation's fourth best children's hospital and the best in Texas in 2012. Founded in 1951, Texas Children's resides in the largest medical complex in the world -- Texas Medical Center in Houston -- and provides primary and tertiary care for children through the hospitals, affiliated practices and health plan. Together, these facilities manage more than 1 million patient encounters each year.

The core of Texas Children's success lies in its commitment to raise the quality of patient care in part by implementing evidence-based care guidelines and measuring outcomes. The hospital is committed to meeting the Institute of Medicine's goal of providing care that is safe, equitable, effective, patient-centered, timely and efficient. As a result, Texas Children's has invested heavily in information systems that enable the delivery of higher quality, lower cost patient care.

The Challenge

In 2006, with the impending transition to value-based reimbursement on the horizon, Texas Children's began to examine its quality improvement program with a strong emphasis on evaluation of data management capabilities. To succeed under a value-based system, the hospital's leaders knew they needed the ability to analyze and better manage specific populations of patients, especially those most-costly patients with chronic problems such as asthma. They also knew they needed to identify areas of inefficiency and waste in their care programs, but lacked the hard data to pinpoint the suspected problems and to uncover other, hidden inefficiencies and safety issues.

To address this challenge, Texas Children's launched an overall quality and safety strategy in 2006. The goal was to develop a comprehensive and integrated enterprise-wide data management infrastructure. The key foundational element involved implementation of an electronic health record (EHR) from Epic Systems, Inc. in order to collect raw clinical and financial data from across its enterprise. This was a critical first step in the data management strategy to transform data into meaningful information needed to guide its clinical quality interventions and waste reduction efforts.

Meeting Expectations

The clinicians expected that the EHR would readily provide data that they could use for individual patients and populations of patients. "Our clinicians thought that the EHR was a silver bullet to get the data they needed (for quality improvement) and they blamed IT when the information wasn't forthcoming," recalls Myra Davis, MSE, Senior Vice President of Information Services for Texas Children's Hospital. "The comment I would hear is, 'I can't get the right data from them,' or 'they don't understand what I need from them.' It created nothing but frustration."

Leaders of quality, clinical and IT departments at Texas Children's knew the solution was to nurture a truly data-driven clinical culture at the hospital and to develop an Enterprise Data Warehouse (EDW) to help meet the expectations of the clinicians.

To help nurture this new data-centric culture, Texas Children's decided to roll out a distinctly different, clinically-driven EDW and new methodology to help it measure care and population health outcomes. Beginning in September, 2011, the hospital worked with Health Catalyst® to implement a clinical and analytic framework that included:

- Implementation of an adaptive data warehouse platform and advanced analytics to collect data from systems inside and outside of the enterprise. This allowed users to report on a variety of short-term operational and clinical metrics.

- Development of permanent, integrated teams of clinicians, technologists, analysts and quality personnel to identify areas for improvement in care processes and build evidence-based care guidelines into the care delivery workflow

- Implementation of a measurement system infrastructure to better track and interpret iterative improvement—a tactic that Texas Children's found critical to sustain improvements.

"Phenomenal" Time-to-Value

Implementation of the Health Catalyst Adaptive Data Warehouse was completed in just three months – a "phenomenally fast time," according to Texas Children's Hospital Director of Quality and Clinical Systems Integration Margaret Holm, Ph.D. Simultaneously, Health Catalyst began conducting its key process analysis, a data-driven, financial and clinical assessment across Texas Children's Hospital looking at variability of care and resource consumption. The assessment results were provided to a multi-disciplinary hospital team that weighed in on the data and chose to focus its quality improvement efforts on asthma and appendectomy care.

A second cross-functional team was hand-picked to assess and manage acute asthma in the hospital from the time of presentation in the Emergency Department to discharge. Just weeks into the project, the team used the fount of new data at its disposal to identify a higher volume of chest X-rays that were being administered to asthma patients. The team recognized that according to the evidence, only 5 percent of the chest X-rays were indicated for asthma patients.

Texas Children's physicians initially reacted to this news in predictable fashion, recalled Charles Macias, MD, MPH, Director Evidence Based Outcomes at Texas Children's. "They said, 'Oh no, that can't be due to our behavior, the data

Texas Children's Hospital

Number of Beds

469

Annual Inpatient Admissions

21,744

Annual Outpatient Visits

1.44 million

Emergency Room Visits

82,049

Inpatient Surgeries

8,655

Outpatient Surgeries

14,439

must be wrong.' But unlike in the past, Health Catalyst enabled us to drill down into near real-time data to reveal patterns and convince them they were indeed responsible. The epiphany for people was that we weren't really performing in general as well as we thought we were."

Texas Children's asthma team acted quickly to address the issue by providing education and analytics dashboards for the clinical staff to monitor chest X-ray procedures. In just one and a half months, the team produced a 15 percent reduction in unnecessary chest X-rays. The act of simply providing the data in a meaningful fashion spurred more improvement than any other intervention. A more formal statistical analysis in the months since then confirmed the trend of chest X-ray reductions.

Expanding the Scope

"Our ability to very rapidly reduce unnecessary X-rays gave us confidence that we could use the Health Catalyst technology and process to change more important outcomes like length of stay," said Robert H. Moore, MD, a pediatric pulmonologist at Texas Children's.

Health Catalyst gives the asthma team the ability to analyze data on demand as opposed to six months later. Armed with this near real-time data, the Asthma Care Process Team is drilling down into specific interventions such as the delay between the time a child walks in the Emergency Center and the time they receive the appropriate asthma medications.

"Those are the kinds of things that you want to see happen in short time frames because they really make a difference in terms of length of stay or even whether a patient has to be admitted," said Dr. Moore. "If we can make that the most efficient it can possibly be, then we think we can reduce length of stays on the front end as well as reduce readmissions on the back end."

Texas Children's early success with asthma has encouraged the hospital to expand its Health Catalyst deployment to include multiple medical and surgical programs and processes. "We're working with Health Catalyst to add chronic asthma, cardiology and pneumonia as well as other conditions or diseases," explained Holm. "The culture is changing and it's all happening very fast."

Today, Texas Children's clinicians are more engaged and enthusiastic about data-driven care improvement, said Holm. Now, clinicians are actively using the data to improve care for patients by asking better questions about how care is delivered and uncovering the root causes of variation. In turn, rapid clinical feedback has proven critical to reduce the development time required by technicians and analysts to build out the advanced analytics that are necessary to monitor and sustain improvements.

For Davis, the direct involvement of clinicians in the analysis and transformation of data is a breath of fresh air. "A huge measure of Health Catalyst's success is that I know their teams are still here engaging with our clinicians and yet our department isn't involved," she said. "Which means we've succeeded in getting our clinical teams to engage directly with the data and learn from the data. Every time I hear how the EDW is referenced by clinicians and how the organization is using a rich repository of data to improve quality outcomes, all I can do is smile and say, wow, mission accomplished."

Future Directions

While the process improvements in asthma are still in their early stages, Texas Children's expectations have risen that they will find similar opportunities across other areas of care. The hospital expects the active use of transformed clinical data to continue to increase, resulting in a reduction of the cycle time for clinical process improvements. The future goals for Texas Children's quality improvement effort include providing near real-time process and outcome metrics, standardizing in the delivery of evidence-based care, enhancing gains in operational efficiencies and clinical effectiveness, increasing utilization of the tools by clinicians, and improving strategic alignment towards managing populations.

"Today, we have a solution that integrates data management with evidence-based practice, operational data and financial metrics to allow us to understand the bigger scope of care delivery," said Dr. Macias. "We have never had the opportunity to do that before because so many silos of data existed. Now we can put patients first because we can see the data."

About Texas Children's Hospital

Texas Children's Hospital, a not-for-profit organization, is committed to creating a community of healthy children through excellence in patient care, education and research. Consistently ranked among the top children's hospitals in the nation, Texas Children's has recognized Centers of Excellence in multiple pediatric subspecialties including the Cancer and Heart Centers, and operates the largest primary pediatric care network in the country. Texas Children's has completed a $1.5 billion expansion, which includes the Jan and Dan Duncan Neurological Research Institute; Texas Children's Pavilion for Women, a comprehensive obstetrics/gynecology facility focusing on high-risk births; and Texas Children's Hospital West Campus, a community hospital in suburban West Houston. For more information on Texas Children's, go to www.texaschildrens.org.

About Health Catalyst

Health Catalyst provides data warehousing solutions that actually work in today's rapidly changing healthcare environment. Health Catalyst is on a mission to transform healthcare in the U.S. by utilizing its next- generation data warehousing solutions to accelerate care improvement for all types of healthcare systems. Helping hospitals and health systems to create a data-driven approach to care, Health Catalyst provides clinical, IT and financial executives with the tools and technologies necessary to improve care by reducing costs. Clients include Allina Hospitals and Clinics, MultiCare Health Systems, North Memorial Health Care, Stanford Hospital and Clinics, Texas Children's Hospital, and Providence Health & Services.

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