Mastering the Data Game: Accelerating Integration and Optimization

Healthcare systems are breaking new barriers in analytics as they seek to meet aggressive quality and financial goals.
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s a brain surgeon, healthcare researcher, and data scientist, Nicholas Marko, MD, is used to waiting years for research and data analytics breakthroughs to become actionable. Now, as chief data officer of Danville, Pennsylvania–based Geisinger Health System, his wait time is decreasing rapidly. The future of big data and data analytics has arrived at Geisinger, with bench-to-bedside results happening at breakneck speed. In fact, innovation in data analytics is so fast that Marko says he spends half of his time addressing change management issues. But he isn’t bothered in the least. It’s an exciting time for Marko, who oversees enterprise data strategy and heads up data analytics initiatives in critical areas such as genomics. Over the past few years, Geisinger has started generating sequence data on 100,000 patients. The organization is also doing advanced analytics in areas such as population health management, piloting a program that closes care gaps by scanning medical records to find inconsistent care management or missed medical appointments for patients who have chronic diseases. And that’s just the start.

“We’re accelerating the rate at which we’re implementing these programs,” says Marko. Geisinger—an integrated health system with a 1,200-member multispecialty group practice, nine hospital campuses, two research centers, and a 467,000-member health plan—is in the process of installing what will become one of the largest big-data infrastructures in healthcare in the United States, he says. “We’re trying to scale quickly and not just build a series of one-off solutions,” Marko notes, adding that none of this is possible without a strong culture attuned to supporting data analytics. “It takes the right people, infrastructure, and high-level buy-in to do all of that.”

Hospitals take on new data challenges

Indeed, healthcare organizations are looking for new strategies to manage their growing data streams, including integrating disparate data sources and merging financial and clinical information. They are also seeking new types of data to use in analytics, including patient claims information from government and commercial payers, chargemaster data, information from other providers, and unstructured data, such as doctors’ notes. The ultimate goal is to gain new insights on improving clinical care, managing risk, and controlling costs.

As healthcare organizations move forward with data analytics strategies, however, many admit they are not ready to roll out large data sets; they are also still struggling with key challenges, including integrating data from different areas, finds the 2015 HealthLeaders Media Healthcare IT and Analytics Survey of 367 industry leaders. Of those who do not yet draw on large or complex data sets, only 3% say they will do so within 12 months and just 24% expect to do so with 13–24 months. The plurality of responses, 34%, is from those who do not know when their organization will begin to draw on such data sets to reveal trends. Respondents
said their three top data-related challenges related to performing data analytics over the next three years include integrating clinical and business data, establishing/improving EHR interoperability, and improving data accuracy.

The survey also shows that organizations are looking to use data from numerous areas when it comes to performing analytics. The top four financial data areas include Medicare/Medicaid patient claims (79%), commercial payer patient claims (74%), internal provider productivity data (64%), and patient financial data (58%). The top four types of patient data providers seek include patient demographics (81%), clinical data from the EHR (81%), aggregated EHR and patient claims data (62%), and patient lab and imaging data (56).

The majority of respondents say they use clinical analytics to improve quality (88%) and financial analytics for cost containment efforts (76%), and expect these to be leading focus areas over the next three years. Survey respondents also indicated they will be making major investments over the next year to enable analytics activities, including improving the quality of data (75%), integrating data from external sources (58%), adding or training analytics staff (48%), and training clinicians in analytics (39%).

**Geisinger takes the big-data leap**

As Geisinger seeks to leverage big data and analytics, Marko’s team is working hard to integrate data from multiple sources, including the EMR; its insurance organization; and other sources, such as smaller departmental databases, diagnostic equipment, and business systems. To that end, Geisinger has deployed an enterprise data warehouse for the last several years that brings together 20 disparate databases. However, as the health system expands its data analytics strategy and processes new types of data, including imaging, unstructured text, and genomics information, it is building a big-data stack, which will come online this year.

“Recently we have made a big push to put all of this into a common space because it’s difficult to use data when it’s spread out over 10 different places,” says Marko, who heads up Geisinger’s data science department, which includes three teams focused on operational analytics, data valuation, and R&D analytics. The end goal? Tell each patient’s story to the fullest extent possible by putting people in the middle of the data. “By doing better data management and better engineering, we can put the pieces of information together so that researchers, clinicians, patient advocates, or anybody else are able to see everything we can possibly pull together about that patient,” says Marko. He points out that Geisinger is somewhat unique in that its geographical region is rich with multigenerational patient data. “In central Pennsylvania, there’s a very stable population of people, so we’ve got generations of families who have been cared for in the Geisinger system. So you can imagine if you can see that information from all directions, you will get a very comprehensive understanding about somebody and if they’re getting the care that they need.”

**Translating data into action**

The rate at which Geisinger is able to use data continues to accelerate, says Marko. For example, he says, over the last two years, the health system has been gathering new types of information, such as imaging data and free text data. “It can be hard to extract information from these sources, so we are leveraging natural language technologies and analytic imaging technologies,” he says. As the data has started to flow, Marko says the system launched an initiative in which clinicians look more carefully at secondary information in radiology reports that describe patient imaging studies. “In my clinical field, which is brain cancer treatment, we have a very good multidisciplinary system setup for treating these folks, and so we are doing automated scanning of patients’ image reports to make sure that we were able to offer them easy access to these multidisciplinary resources available to them so that they don’t fall through the cracks.”

Marko says Geisinger also now has unprecedented ability to combine genomic data with clinical and other types of data to gain a deeper understanding of individuals and their health at the molecular level. Through a new grant, Geisinger researchers are studying the molecular basis of obesity. “The grant is enabling us to look for associations that we didn’t know were there before,” says Marko. “This is an information world where data is flowing at us faster and faster. We want to use the latest technology to try to get our arms around as much as of it as we can so we can put it in front of the people with good ideas and let them go crazy.”

—Nicholas Marko, MD, chief data officer, Geisinger Health System
Nicholas Marko, MD, who has served as chief data officer at Geisinger Health System for more than a year, is one of approximately 100 CDOs who hold positions in large U.S. companies, according to some estimates. A practicing neurosurgeon, Marko spends a third of his time in the OR and the rest doing research and heading up the enterprise data strategy. Marko is enthusiastic about his role and shares his thoughts on what it is like to define the new horizon in analytics.

“Forward-thinking organizations like Geisinger see the chief data officer not just as a data manager, but also a strategist who creates more value out of the data. In my role, I oversee enterprise data strategy and data management processes, which includes our data warehouse, data storage, and high-end analytics. It’s great because I’m a clinician, so I’m immersed in the end-user world of things all of the time. I see how the data is used. My responsibilities cover the full spectrum, including how data comes into our technology stack, how it’s stored, how it’s related to other pieces of data, how we integrate information, and how we deliver that to the end user.

An important part of that role is being an advocate for the end user because lots of organizations have data that they put in silos or with different people who have taken ownership over from the end users. Part of my job is to help break down some of those artificial barriers between pieces of information so that our doctors, researchers, innovators, and businesses can get to a broad spectrum of information about our patients and use that in a coordinated fashion to provide the best possible care.”

Spotlight: Inside the Role of Chief Data Officer

Using analytics to improve heart care in Washington

On the opposite coast, in Washington, a health system and a local university are partnering to take data analytics to a new level. In 2012, leaders at MultiCare Health System—an integrated health system with five hospitals in the Tacoma area—asked researchers at the Center for Data Science at the University of Washington Tacoma to partner with them in improving care for patients with congestive heart failure. Researchers were tasked with analyzing readmission cases to find patterns in the data to help improve future care quality and reduce hospital readmissions.

David Hazel, the managing director for the Center for Data Science at the University of Washington Tacoma, points out that his team has done that and more. “What differentiates us from a research perspective is, in addition to focusing on building highly effective algorithms and tools that are scalable, we also spend a lot of time thinking about how we can operationalize them.” From the start, the university worked with MultiCare, which also provides outpatient, primary, and urgent care services, to design a data analytics program that would not only predict which patients were likely to be rehospitalized within 30 days but also help the organization improve those rates, says Hazel. Three years later, the partnership has evolved. “What we have developed is a platform for chronic disease condition management,” says Hazel.

The collaboration between the university and MultiCare involved accessing data from multiple sources, including the EMA and a data warehouse, as well as state claims data, psychosocial information, and hard-to-track information such as medication compliance and data from pill boxes and other monitoring devices. Today, the new analytics platform enables MultiCare providers and caregivers to generate an accurate list of congestive heart failure patients that includes each person’s continuous risk score and readmission risk factors. Every interaction the patient has with the health system, from seeing a physician to being assessed for risk factors such as access to transportation, is factored into the risk score, says Hazel. “For example, if a patient has a high risk because they have a history of smoking, you can track that back to compliance, where the social worker and others can focus on making sure they’re compliant with their smoking cessation plan.”

He notes that an analytics program does not only succeed because of data—Hazel’s team also took the time to understand MultiCare’s existing workflows. “We went on rounds with cardiologists,” he says, noting that researchers learned the nuances of heart disease and care protocols. “You have to have strong partnerships and buy-in from across all levels of the organization.” Such efforts have resulted in a predictive analytics tool that allows clinicians at MultiCare to predict with 82% accuracy whether a patient will be readmitted to the hospital within 30 days.
THE NEXT STEP IN HEALTHCARE ANALYTICS: CHILDREN’S HOSPITAL OF WISCONSIN

Children’s Hospital of Wisconsin (CHWI) and its physicians are ranked among the best in the nation. To maintain this level of quality and efficiency and identify improvement potential, CHWI made a strategic decision to expand its analytics capabilities.

TURNING DATA INTO INFORMATION
Consultants from FTI Consulting partnered with CHWI to examine its 544 standard reports. Together, they streamlined the process and reduced overhead. They replaced one-way reporting with interactive dashboards that management and clinicians could use to identify opportunities to improve care and lower costs.

The team reviewed the cost accounting system to identify the true cost of services. They developed various Executive and operational dashboards to display key metrics such as average length of stay, reimbursements and point of service collections — broken down by department.

A PORTAL FOR IMPROVEMENT
Once CHWI had real information in the hands of managers, they could focus improvement efforts. Leveraging clinical and technical expertise from FTI Consulting, CHWI analytics staff identified other data valuable to its clinicians and developed user-friendly access through a password-protected analytics portal.

Training sessions from FTI Consulting enabled the CHWI team to better understand and meet the organization’s information needs. As the number of clinicians relying on the portal steadily grows, CHWI takes more steps toward becoming a truly efficient, data-driven organization.

“"Our partnership with FTI Consulting has helped us meet our strategic and operational goals in analytics.”

ABBY DEXTER
Performance Intelligence Manager, Children’s Hospital of Wisconsin