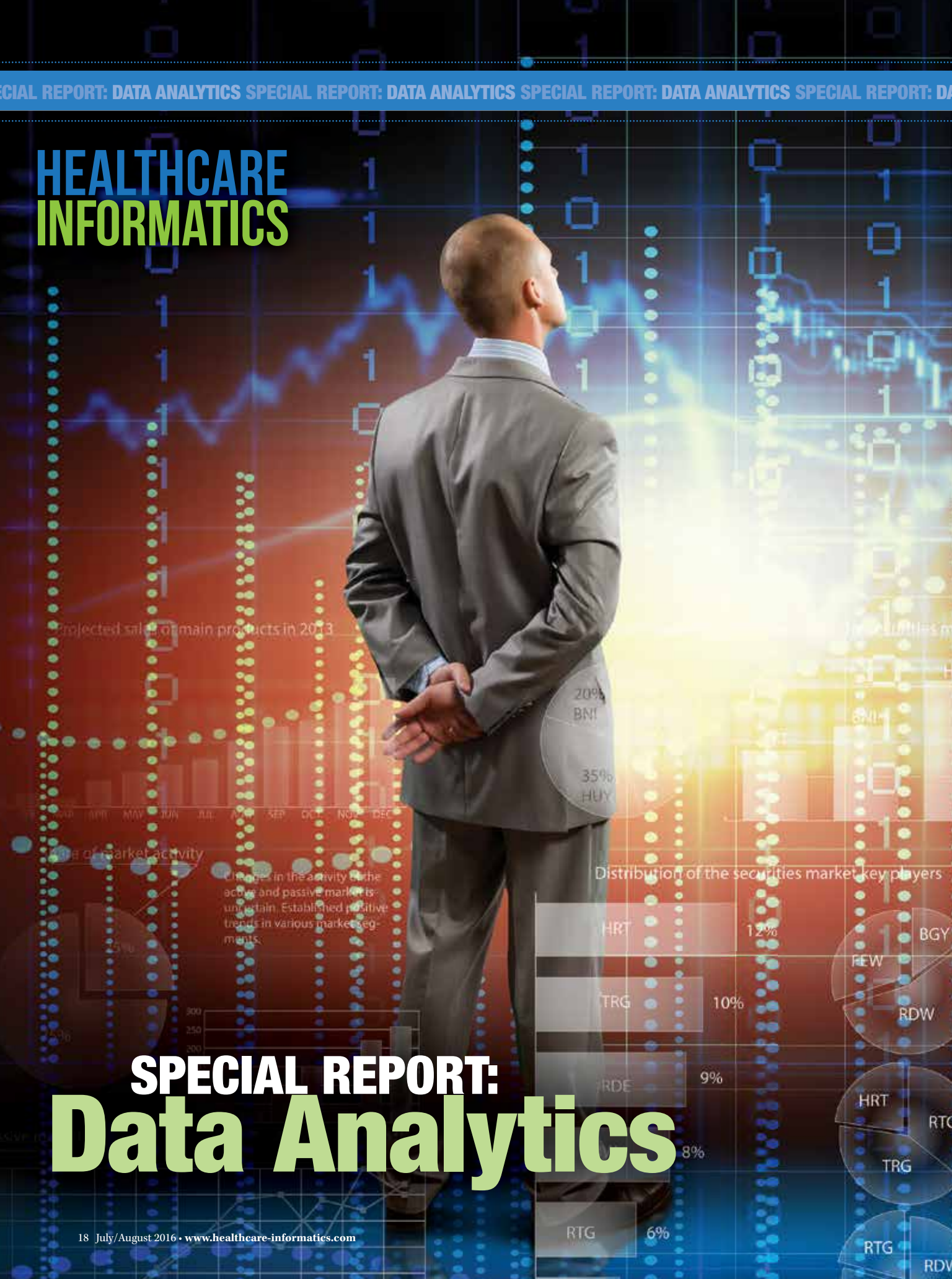
HEALTHCARE INFORMATICS



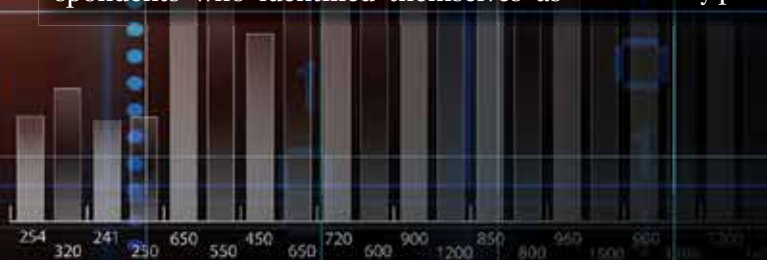
SPECIAL REPORT: Data Analytics

Moving Along the Data Analytics Continuum, Healthcare Organizations Continue to Make Strides

Many patient care organizations are still in "planning" mode when it comes to leveraging sophisticated data analytics tools, but the message is clear—advanced analytics will be a necessity for survival **BY RAJIV LEVENTHAL**

More and more, across healthcare organizations nationwide, data and analytics tools are being seen as a means to improve efficiency and quality. Yet, according to one survey from KPMG LLP, a New York City-based audit, tax and advisory firm, only a small fraction of those in the industry are using these capabilities to their fullest potential.

The March 2015 survey of nearly 300 respondents who identified themselves as being employed by providers, payers, or life sciences companies, found that only 10 percent are using advanced tools for data collection with analytics and predictive capabilities. Twenty-one percent indicated that they are still only "planning their journey." Of the other respondents, 16 percent said they are using data in strategic decision making, while 28 percent are relying on data warehouses to track key performance indicators.



	TYU division			FRT division		
GHT	254	550	254	274	154	415
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TRG	241	450	144	364	954	174

Indeed, as the provider community continues to prepare for the shift to value-based care and being at risk for various patient populations, it's as clear as ever that sophisticated analytics tools will be a necessity going forward—even if adoption levels are still currently low. Speaking to the survey's results, Bharat Rao, Ph.D., KPMG LLP's national leader for healthcare and life sciences data analytics, says that many organizations are not where they need to be in leveraging this technology, and that providers need to employ new approaches to examining healthcare data to uncover patterns about cost and quality.

Dr. Rao, who has more than 60 patents tied into the realm of healthcare informatics and analytics, personally looks at analytics on a "full stage," that moves from descriptive (what happened and why it happened) to predictive (what will happen), and then to prescriptive (what I should do about it). "I will say that we have gotten pretty good at descriptive analytics," Rao attests. "There are tools out there that do a good job of painting a picture of the near past. It's no longer acceptable to take 45 days to get quality measure reports back out," he says, offering an example of improvement in that area.

However, Rao points to both the huge gap and potential for predictive analytics, and he notes that prescriptive analytics is something that doesn't happen in healthcare today. "Readmissions tools do a reasonable job, but there is a big gap there. One thing that has changed over the last decade is the recognition by provider organizations that analytics is not a nice shiny toy, but something that has become increasingly important for them to survive," Rao says.

DIVING INTO UNCHARTED WATERS

It was a few years ago when David Seo, M.D., current University of Miami (UM) Health System associate vice president, information technology for clinical applications, and chief medical informatics officer (CMIO) of the Miller School of Medicine, and other health IT leaders at the health system began to truly understand the evolution of where healthcare was going. "Patient-centered medical homes and ACOs [accountable care organizations] were the trends under the main idea of managing risk," Dr. Seo says. "I was getting multiple calls and visits from vendors offering analytics solutions, one after the other, and what became clear was they were not offering a true full suite of what a health system needs to manage risk. Our own EHR [electronic health record] vendor talked to us, but even what they could provide was limited."

> **"THERE ARE TOOLS OUT THERE THAT DO A GOOD JOB OF PAINTING A PICTURE OF THE NEAR PAST. IT'S NO LONGER ACCEPTABLE TO TAKE 45 DAYS TO GET QUALITY MEASURE REPORTS BACK OUT."**
>
> *–BHARAT RAO, Ph.D.*

Seo says that UM Health System was looking for company that had a long track record of understanding data analytics and security, so it ended up choosing Lockheed Martin, a Bethesda, Md.-based global security and aerospace company with involvement in healthcare analytics. "We knew were headed towards a clinically integrated network and other things of that nature," Seo says, noting the need to establish a data environment, implement big data analytics and predictive modeling tools, and start to stratify patient data and conduct risk assessments.

Seo agrees with Rao in that predictive analytics in healthcare "is still very much in its infancy no matter who you talk to." Indeed, aside from the basics such as readmissions, true predictive analytics has not come to fruition, he notes. To this end, University of Miami Health System started out with a diabetes risk model, and clinician leaders have shown that the model can fit within providers' workflows, Seo says. He adds that the risk model can be ordered through the organization's order entry system, or it can have a patient ask to run that risk model themselves in test environments. "The risk model returns a score, so you understand your risk of developing diabetes over the next five years, for example. And now we are engaged with our clinical staff to [look at] things such as what is the threshold we would set to apply an intervention, for instance," Seo says.

Seo further emphasizes the importance of the health system's work around different validations, which he says is a necessity before a risk model of this scope goes into production. He explains two key areas around validations. First, the validation of a phenotype or a diagnosis using EHR data needs to be validated for the system. "If I am going to say you do or do not have diabetes for example, that needs to be valid, and you need to understand what the positive predicted value of that phenotype is," he says.

Second, he says, the diabetes prediction needs to be valid for a specific population. "I like to say that population health will be local, so the diabetes model that we pull from the literature has been validated form a highly specialized population that perhaps is of different racial or ethnic origins from our south Florida population. So what we're doing is validating the phenotype in our population, and also understanding what the performance of that

model is in our population. These are two important steps before going live with this prediction model," Seo says.

Other healthcare organizations are making their own advancements in the analytics space. Rao points to industry leaders such as Mayo Clinic and Cleveland Clinic, where prescriptive analytics, such as precision medicine, is happening in pockets. "Leading organizations are starting to get ahead of the curve, and are recognizing that healthcare is changing into an at-risk model, so you as an organization will be responsible for care outside your four walls," Rao says. "You are now responsible for the entire cost of the patient, so you have to track what happens to them," he adds. As such, the organizations that are at the cutting edge are recognizing that even though today the portion of [value-based] payments is only 5 to 10 percent, it will be 60 percent by 2020, according to some folks, he says. "Providers are gearing up to get the data infrastructure, care coordination tools, analytics tools, and contracting tools to deal with that transition. That's starting to happen," Rao says.

Moving forward, Seo stresses that while vendors are now rolling out the tools to make disease management easier, health systems need to re-engineer their operations since it's not just about looking at the doctor-patient relationship anymore, but rather healthcare leaders have to think about it now in terms of one-to-many simultaneous relationships. "Healthcare organizations have to readjust their care delivery patterns to fit this population health idea," he says. "It can be hard, and it's not the way we traditionally practice medicine. Also, some of your population will be managed this way while others won't be, while finally keeping in mind that you have pressures of new payment models," Seo says, speaking to all of the challenges health IT leaders now face.

Seo additionally notes two core challenges that can become present in this area of analytics and disease management: provider behavior and patient engagement. Regarding the former, simply turning on alerts in a system, or sending alerts at the point of care, will lead to failure if that's the objective someone is looking for, he says. "We have engaged with subject matter experts who are M.D.s, as we have been developing our work around diabetes, and they have been involved in a number of our activities and interactions. They have been fully participatory, they have bought in and [been supportive], and if you don't get that, you won't get true change in physician behavior," Seo says. "Doctors can be very good in finding a way around something they don't agree with, so that's what you'll get. Or you will get compliance without commitment to the process. Provider behavior starts with engagement early in the process from all levels."

Regarding patient engagement, Seo says that in newer accountable care models, there's accountability for all parties involved—including patients and their families. "You want to give patients a method to interact with their own information. Our mindset has been to give them as much data as we can in a safe and appropriate manner so in their discussions with physicians, they understand what's going on and can participate in their own healthcare."

Rao says that from an analytics perspective, the top challenge above all is, that when looking at this transformation of care, there is a large portion of the healthcare provider population which is doing well in the current fee-for-service system, and there isn't an incentive enough for them to change. "So there is a mindset that says we need to change, and that needs to come," Rao says. When the feds made the announcement about 60 percent of care being tied to quality, I expected there to have been seismic shockwaves through the community, but people haven't reacted like that yet. It's almost as if they think it might not happen or after the election things will change," he speculates.

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>
> **–DAVID SEO, M.D.**

Rao further notes the amount of unstructured data that is locked away. "How to you make it accessible for analytics? We collect data and notes every day on patients, and that needs to become actionable," Rao says. He adds that the good news is that there are tools here to help that are about to become more sophisticated. "People say healthcare data is messy, but nothing was messier than the Internet. Google, Yahoo, Bing and Microsoft have done the greatest job in making that unstructured data useful, and now [the Internet] is the single greatest resource in history of mankind," Rao says. "It's about taking that free text and crunching it in a way to find the patterns that make sense. That's a technology revolution waiting to happen." ◆

Leveraging Information Technology to Manage Patient Care and Improve Outcomes

Today's healthcare environment requires providers to shift their focus away from single visits and treatments to more collaborative and participatory care. As part of this movement toward population health management, organizations strive for success in meeting quality measures and regulatory requirements, collecting and analyzing data to identify gaps in care, and improving clinical outcomes all while reducing costs.

Healthcare organizations look for technology solutions to help identify risk, capture patient data from multiple sources, and coordinate care. They also seek tools to fully engage patients in their healthcare and provide ongoing post-discharge care.

Existing Solutions Only Address Part of the Problem

In the current marketplace, a variety of solutions help providers achieve care coordination. These solutions include electronic health records (EHRs) as well as systems that integrate with an EHR. However, these solutions face shortcomings, such as care life cycle limits focused only on treatments within the hospital, risk identification relying on other tools for risk assessments, and service networks making referrals only to a specific network. Other deficiencies include ongoing assessments tools, which lack the ability to consolidate data and present options during patient follow-up events.

Providers require a comprehensive solution to close the loop on care coordination.

Driving Population Health Initiatives

ARGO Patient Risk & Outcome Management software helps healthcare organizations more effectively manage population health initiatives, including managing quality measures and regulatory requirements, minimizing risk, identifying gaps in care, lowering costs, and expanding revenue. Beginning with in-hospital/in-office case management through referral management to risk stratification and interventions, Patient Risk & Outcome Management provides ongoing care coordination in a single solution.

Patient Risk & Outcome Management also enables providers to engage patients in their treatments across care settings, taking into account their needs and preferences. The solution combines dynamic assessments, workflow, and post-discharge scheduling.

Identify, Stratify, and Mitigate Patient Risk

The process of evaluating patient risk begins at admission as case managers collect information to populate the ARGO risk model or the organization's existing risk model. Case managers update the patient's risk rating throughout their stay, resulting in an adjusted schedule of post-discharge care and follow-up interventions. Because patients may require more than risk assessments, ARGO's dynamic questionnaire creates surveys, combining risk and care assessment questions on the fly. This interactive, context-responsive functionality combines disease, behavioral, and risk-specific questions to identify patient care needs at each opportunity. The physician office or hospital defines business rules to convert this information into automated follow-up tasks that case managers may amend or modify.

Whether reducing readmissions or decreasing costs of care, risk modeling helps organizations achieve their goals. ARGO supports existing risk models, while also providing options for custom approaches. Scores from these models provide input into organization-defined business logic, which stratifies patient risk, assigns tasks, and determines the frequency and breadth of care.

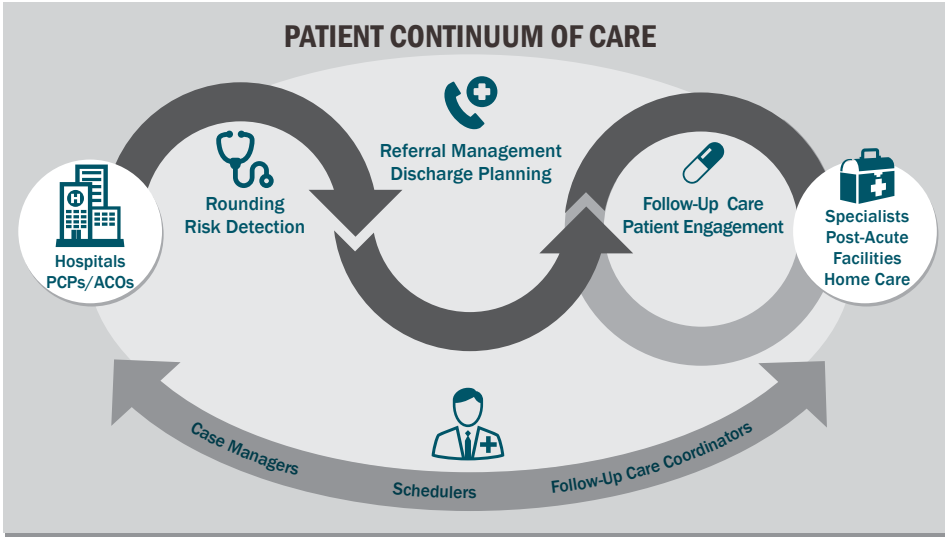
Measure Results and Identify Care Gaps

Along with risk models, Patient Risk & Outcome Management provides key performance indicators (KPIs) and drill downs, enabling organizations to identify issues and take appropriate actions to improve outcomes and increase revenue. KPIs include risk management, readmission rates, satisfaction, appointment compliance, and in-network revenue retention.

Coordinate Referrals, Post-Discharge Care

To avoid moving patients from one care setting to another without proper handoffs, Patient Risk & Outcome Management ensures all care team members receive notifications of patient admission and discharge, discharge summaries, and medication lists via automated integration with the organization's electronic health records.

Solution functionality provides the care manager with the information needed for scheduling and arranging post-discharge services. This includes transferring patients to post-acute facilities, securing durable medical equipment, scheduling specialist referrals, and arranging outpatient services such as home health. As patients move from primary care to specialists, care notes and documentation follow, supplying each provider with complete information to deliver high-quality care and a seamless transition. Using this information, care coordinators monitor progress and follow up throughout the process.



Fully Engage Patients in Their Care

Patient Risk & Outcome Management equips organizations with the tools to actively engage patients in their care, capturing and applying patient preferences to increase engagement, satisfaction, and quality. Case managers record patients' top choices for providers and communications at any time during contact with patients, their families, and their caregivers. Patient choices include distance, languages spoken, and preferred providers.

Patient communications at discharge and ongoing notifications keep patients well informed of their appointments. Automated workflow tasks help organizations identify when to make follow-up calls to address missed appointments and reinforce the importance of subsequent care.

Leverage In-Network Provider Relationships

Whether operating under fee for service or managing costs through at-risk contracts, effective use of provider networks helps capture in-network revenues. The ARGO solution enables healthcare organizations to select follow-up care based on patient care needs, organizational network preferences, existing patient-physician relationships, insurance coverage, and patient preferences.

Support Government Regulations, Initiatives

The healthcare industry moves more and more toward care management beyond the boundaries of single healthcare encounters. Patient Risk & Outcome Management provides support through systematic care coordination tools and ongoing care management to align with government regulations and national quality strategies, earn related incentives, and avoid penalties.

About ARGO

Applying more than 35 years of experience, ARGO develops scalable, mission-critical software for financial services and healthcare organizations. ARGO solutions transform processes using proven business models and software innovation informed by real customer challenges, breakthrough technology, and rich analytics. Core competencies include network-based software development and monitoring, workflow, imaging, forecasting, optimization, pattern recognition, and record matching.

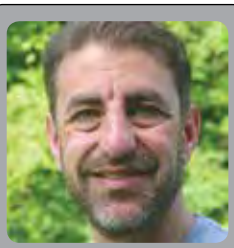
ARGO Healthcare Solutions

For more information on ARGO healthcare solutions, visit **Healthcare.ARGOData.com**.

Faster Analytics at University of Michigan Health System

A five-member Fast Analytics team at University of Michigan Health System has incorporated data visualization software that has changed the game for report generation throughout the organization **BY RAJIV LEVENTHAL**

As *Healthcare Informatics* reported as part of its Up and Coming health IT vendors' section last issue, many data analytics companies have recently gained momentum because they address a pain point in the provider space. But other vendors in this segment, such as Seattle-based Tableau, featured in last month's *Healthcare Informatics* 100 issue, offer data visualization products with a focus on business intelligence (BI). One of Tableau's health system clients is the University of Michigan (U-M) Health System, which has a Fast Analytics team whose job is to crunch data and assist more than 30 groups across the health system—which has three hospitals, 40 outpatient hospitals, and more than 140 clinics—with their dashboards.



Jonathan Greenberg, M.D.

Jonathan Greenberg, director of the five-member Fast Analytics team at U-M Health System, says the team's core question that it asks itself over and over is, "How do we do reporting and analytics here better?" To that end, the Fast Analytics team has a key philosophy around three major groups: skills, process, and tools, Greenberg says. "By fine tuning that triangle, based on the staff you have, you can come up with a successful environment to improve reporting and information decision making, which was our main goal."

About five years ago, when the 990-bed U-M Health System was looking for analytics tools, Greenberg's analytics team was being carved out from the organization's central IT team; it was mostly focused on professional billing, he notes. "We were the red-headed stepchild in a medical school IT shop. We were managing the billing system and things like RVU [relative value unit] recording, and all recordings surrounding billing."

Indeed, at that time, the analytics team at the U-M Health System managed a large and outdated billing system. To produce reports, they either had to do the coding themselves or pay large fees to an outside vendor, and the final output was often late or incorrect. "We had to fight our way through all kinds of vendor interactions in order to have the right to pay huge sums of money for report alterations, and it wasn't a cost effective way of reporting. Also, it wouldn't let us see the next layer of reporting in our organization," Greenberg notes. At the same time, the health system was looking at Epic, he adds. "I was very involved in those initial stages, and I realized there was a huge missing reporting and analytics component there too. And so everything kept coming back to Tableau," he says, specifically noting his organization's capability to leverage the vendor's automation and data visualization techniques. Greenberg said that throughout the whole vendor selection process, U-M Health System looked at 14 different packages spanned across an 18-month period.

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>
> **–JONATHAN GREENBERG, M.D.**

Now, Greenberg points to having the ability to find outliers and being able to do multi-dimensional outlier searchers so the analytics team can zoom in on characteristics. He gives an example of such characteristics that are causing doctors to be margin negative rather than margin positive on the same procedure. "It's about helping to answer questions like that by finding trends and outliers, but more important than that, it's giving people a simple and intuitive way to drill down into the data," he says. "If we build the dashboards right, the menu structures and everything else are intuitive, and people know how to use the tool without much training. That is so incredible," he says. "Doctors out there don't have time; if they wait more than seven seconds for a page to open, they're gone."

Andrew Rosenberg, M.D., CIO at U-M Health System, adds that problems that are being solved with Tableau are concentrated. He says visual analytics help solve the complexity of the interaction of financial and billing data as it relates to operational needs that go beyond revenue cycle, such as the ambulatory space, and the health system's cancer center. "It's our ability to extract new meaning, new information, at the minimum, from what one might consider as traditional finance and revenue cycle billing data," he says. "Our [head] of the entire revenue cycle recently kept making it clear to me, 'Remember that you're not just helping me and the revenue cycle, but you're helping me become a provider to many other business customers in our health system who always want to see financial and revenue cycle data to meet a variety of different needs.'"

For Rosenberg, the dashboards that stick out to him are when the analytics team is, in a refined manner, look for the work productivity by type of work of the health system's actual IT employees—those who are building reports and analytic extracts for the entire medical center's mission. "Our ability to dive into details across a large team of 40 people to enhance productivity with Tableau has improved our efficiency by between 10 and 15 percent, just by having a tool to look across a group's complex work," he says. Also, Rosenberg notes, the RVU dashboards are used to demonstrate a variety of RVU-based measures to pretty much every type of division in the entire academic medical center. And there isn't one dashboard, but rather some 80, that could stem off a common view, he says.

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>
> *–ANDREW ROSENBERG, M.D.*

Andrew Rosenberg, M.D.

What's more, at HIMSS16 in Las Vegas, Tableau announced an agreement with Epic in which client-created Tableau analytics workbooks and dashboards will be integrated with Epic's electronic health record (EHR), enabling direct access from EHR users' workflows. On the partnership, Rosenberg notes, "I don't mind, if when I am logging into Epic, I then have to click on a hyperlink to go into Tableau natively and see things. I would prefer if it were fully and deeply integrated, but what I don't want to do is keep having to log in and back out of everything. What I have started to see is the ability to start integrating Tableau dashboards into Epic further."

Regarding results, Greenberg adds the team was able to create a charge estimate tool for customer service staff that went from taking 4.5 hours to complete to 4.5 seconds with Tableau. "And 17 people could do work that only two specialists could do before. Also, we eliminated 4,000 hours of work out of their schedule for next year, and for future years," he says. What's more, Greenberg points to some 10,000 hours work eliminated, or four to five full-time equivalents (FTEs). He also notes a recovery of $3 million in RAC money from Blue Cross as part of a one-time amnesty program the payer had. While Greenberg's analytics work is limited to revenue cycle, where he says he has made 105 workbooks, the Fast Analytics team has helped 26 other departments spin off their own sites, sharing their visualizations and reports. "They're really doing all kinds of marvelous things," he says.

Greenberg additionally explains the team's "one-hour challenge" strategy in which it would get a customer's data and do a quick brainstorming session. "Then, we go off and spend one hour programming a dashboard. And we'd shoot for an 80/20 on one of their problems [finding an 80 percent solution]. And we'd go back and we'd hand it to them. And we would hear, 'This solves 80 percent of my problems.'" ◆

The power of inventory management: Turning data into insights for better outcomes

Supply chain analytics, when enabled by the right data collection technology such as RFID, can be a game changer. These analytics have the power to help today's hospital leaders better predict, trend and analyze product utilization information at every touchpoint throughout the enterprise. Analytics also have the potential to transform the entire healthcare supply chain, from the manufacturer all the way to the patient. Here, Jean-Claude Saghbini, CTO of Cardinal Health™ Inventory Management Solutions, discusses these trends, and talks with us about how end-to-end supply chain analytics can transform data into actionable insights that can lower costs, improve efficiency and lead to better patient outcomes.

Can you briefly explain how supply chain analytics are different from the kind of data found in an EMR, materials management or other clinical IT system?

First, supply chain analytics extend beyond the walls of the hospital. They encompass end-to-end product data from the manufacturer all the way to the patient. Second, supply chain analytics based on accurate technology – RFID for example – can combine purchasing, inventory and patient usage data – across the enterprise – in one place. That end-to-end visibility provides actionable insights that can allow hospital leaders to continually optimize the entire supply chain.

What about the connection between supply chain analytics and quality care…how can supply chain data be used to enhance patient outcomes?

When you have robust information about all of the products in your supply chain, you can very closely manage – and therefore avoid – discrete events that impact patient safety, like expired products, stock-outs or the presence of recalled products.

But the impact goes beyond that. It's well known that variability is the enemy of quality. Chances are that across every IDN, different hospitals, departments and clinicians are using different products for very similar procedures. A powerful analytics platform harnesses product usage data across all hospitals and departments, so you can start looking at product use, choice and availability holistically across the IDN. That kind of visibility allows you to identify, share and adopt best practices for product usage, so you can drive down costs while improving outcomes.

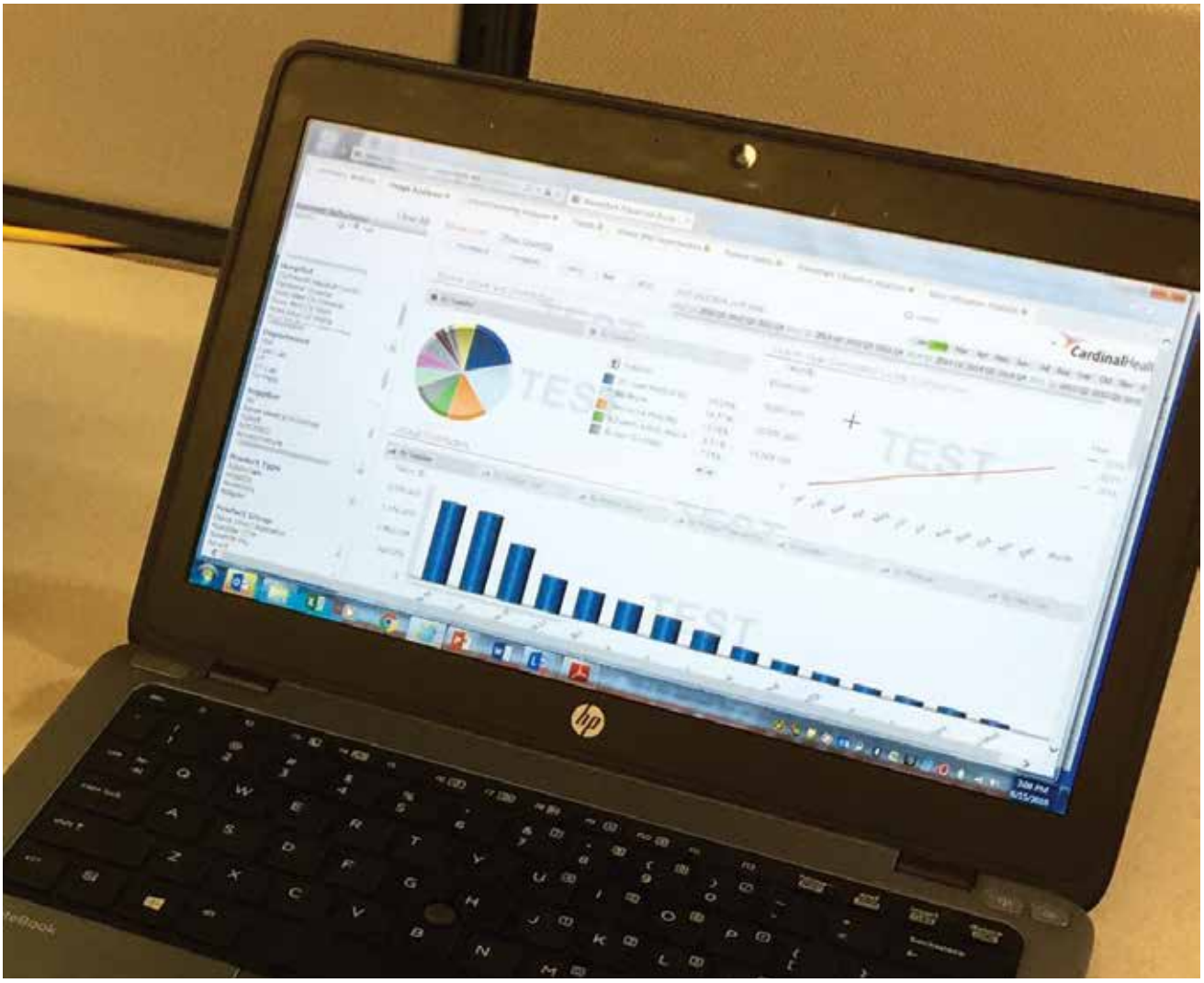
Lastly, having the right supply chain technologies in place can free up clinician time to focus on patient care. When products are immediately available when and where they're needed, clinicians can spend far less time preparing for procedures or leaving the bedside to search for products. That means more time spent caring for the patient – supporting initiatives around quality of care.

Let's talk about consignment. If most of a provider's products are consigned – do they still need analytics?

One of the biggest misconceptions about consignment is that it's free. It's not. Even though a hospital isn't carrying the cost of a consigned product on its books, that hospital is likely still responsible for knowing where that product is, at any point in time, and at any location, until it's used in a patient. And you need technology for that. But if you take it up one level, inefficiencies caused by ineffective inventory management – consigned or not – are always present. And they don't just impact the manufacturer. The cost of that waste ends up getting factored into the cost of products, which ends up driving up costs for all of us. Data analytics can provide all players in the supply chain with the actionable insights they need to have the kind of partner-to-partner discussions that can drive all possible inefficiencies out of the system. And that benefits us all.

With all the supply chain technologies out there, what elements should a hospital or IDN look for when evaluating options?

As healthcare continues to experience significant consolidation, it's increasingly important that a supply chain technology can scale to work at the enterprise level – covering multiple departments and hospitals across an IDN. Second, it needs to be able to cover all of the products that flow through the IDN supply chain – while also having the flexibility to treat those products differently. For example, one would use



advanced RFID technology to track expensive implantables, while inexpensive consumables would require different tracking mechanisms. But all the data needs to flow through the same platform, to provide a truly holistic, enterprise-wide view of all supply chain data. It's also very important for an IDN's analytics platform to have the flexibility to treat each specialty area differently. For example, the dashboard and usage reports needed for a cardiology unit aren't the same as those needed for an orthopedics department.

With the evolution toward value-based care, how can supply chain analytics help hospital leaders address Triple Aim goals?

Triple Aim initiatives are focused on delivering better care to patients, improving the overall health of populations and reducing healthcare costs. Supply chain analytics, enabled by a robust and accurate technology such as RFID, can address each one of those goals. This kind of technology can help hospitals right-size their inventories, improve charge capture, remove waste from the system and ensure the cost to provide care is the lowest it can be. It can impact quality of care by freeing up clinician time to focus on patient care, by helping to ensure that the right products are there when they're needed, and by helping to ensure the wrong products – like those that are expired or recalled – never reach the patient. And once an entire IDN utilizes supply chain analytics, the data can be analyzed to identify product usage patterns, uncover and share best supply chain practices and reduce product usage variability, which almost always leads to better care quality.

At UCHealth, Deploying a Predictive Analytics Tool to Improve OR Utilization and Enhance Patient Care

University of Colorado Hospital, a part of the five-hospital UCHealth system, is using health IT to optimize operating room utilization by deploying a data analytics platform that uses lean principles and advanced data science **BY HEATHER LANDI**

Last fall, the University of Colorado Health (UCHealth), a five-hospital health system that serves communities across Colorado and operates clinics in Wyoming and Nebraska, deployed a predictive analytics solution in its infusion centers to better manage scheduling complexity and improve resource utilization. That technology implementation proved so successful that UCHealth leadership are moving forward to deploy a similar solution for its operating rooms with the aim of optimizing OR utilization to improve efficiency and enhance patient care.

UCHealth announced a partnership with Silicon Valley startup LeanTaaS to deploy its iQueue for Operating Rooms solution at the health system's flagship hospital, Aurora, Colo.-based University of Colorado Hospital for its 38 OR rooms. The health system plans to integrate the data analytics platform into all OR operations at all five hospitals—109 OR rooms total—later this year and next year, according to UCHealth CIO Steve Hess.

Hess says the deployment of the data analytics platform, first at the health system's infusion centers, and now in its ORs, enables the health system to tackle some of the most complex challenges of hospital operations, specifically related to capacity issues and workflow.

"We're good at a lot things—we have brilliant clinicians, brilliant nurses, incredible administrators and clinical leadership. We have an enterprise EHR [electronic health record] system and we have really good robust data out of the system. We have good process improvements, but some of these workflow and capacity issues are really hard to work through, because people can see the data, but they don't understand how to take action on the data. The combination of process improvement and data analysis is hard, to say the least. What we're seeing is that often it's easy to get the data out, but it's hard to then translate that into improvements in the EHRs or with workflow to actually make a difference," he says.

Operating rooms are key resources in a hospital, but most hospitals struggle to manage OR blocks efficiently due to the complexities involved. The manual OR block allocation process, which uses thumb rules and anecdotal evidence to assign OR time to surgeons, results in inefficient operations: a high volume of critical OR blocks go unused and operational bottlenecks go unnoticed, causing severe inefficiencies, according to LeanTaaS.

Hess refers to the OR block allocation process to a Tetris game with schedulers and administrators trying to allocate the blocks of time with maximum efficiency and also enable surgeons to have maximum efficiency. "We often default to scheduling full-day blocks and half-day blocks, so you may schedule a six-hour surgery that only takes three hours."

The iQueue for Operating Rooms platform uses lean principles and advanced data science to examine dozens of OR operations parameters and then builds predictive models to forecast usage patterns and allocate OR time efficiently to meet hospital objectives. Hess says the analytics platform will provide the health system deep visibility into OR utilization. "It tells us why we're not fully utilizing our operating rooms, where

the bottlenecks are, and how we can make it better. Every minute of OR time is valuable; even a small gain can have a big impact on our bottom line," he says.

"If we can make use of those ORs much more efficiently that should improve physician satisfaction, and ultimately, increase patient satisfaction, because they can get their elective surgeries scheduled much more timely and efficiently," he says.

And, the deployment of this latest technology is just one example of how UCHealth leadership leverages health IT for system-wide process improvement initiatives.

"This is the kind of stuff that gets me out of bed in the morning, to really make a difference for our doctors, for our nurses, for other staff members, and most importantly, our patients," Hess says.

For the last several years, the health system was focused on implementing the enterprise EHR system and Hess refers to this predictive analytics initiative as the "next step on the journey."

"For most systems out there, the end of the journey is not implementing the EHRs, it's actually making use of it to improve processes and patient care and the experience for doctors. And, to me, this is one of the most exciting things we're doing because we are now getting to that."

Last year, UCHealth worked with LeanTaaS to adopt its analytics platform to address scheduling complexities with its infusion centers for cancer treatment. "We were having issues with 14 percent continued growth of infusions and long delays, long waits, and peak periods in the middle of the day where we were really not efficient. As a result, our patients were suffering, in terms of there being significant delays in getting that treatment done and we were unable to do add-on, same-day appointments," Hess says.

The health system adopted LeanTaaS' iQueue data analytics software for its infusion centers, which went live in October, and has been able to "level off those peaks and valleys" with more efficient utilization of resources and optimal scheduling.

"We saw a 7 percent increase in patient volume, up to a 16 percent increase in patient volume during our peak periods, without an increase in staff or an increase in infusion chairs and beds," Hess says. With the deployment of the technology, UCHealth cut patient wait times by 33 percent across the entire day, with a 60 percent decrease in patient wait times during peak hours, and a 28 percent decrease in overtime hours. "So it was a win-win-win," Hess says.

He continues, "We started with infusions because it's a smaller scope and it's more easily managed, and we saw success there. So, we decided to look at how we can use this capability with our other highly constrained areas, so we turned to the OR, because it's a need of ours, it's an expensive resource and we are constantly battling over the idea of whether we need more ORs."

iQueue was designed to solve scheduling and operational performance problems using data science and optimization algorithms, according to Mohan Giridharadas, founder and CEO of LeanTaaS, and the technology has been deployed in about 30 infusion centers across the country, including Stanford Cancer Center, a part of Stanford Health Care. The technology has been expanded to other hospital operations, such as operating rooms, and UCHealth is the first hospital to deploy the iQueue for Operating Rooms solution.

"Through this technology, you are able to abstract the data out of the EHR system and LeanTaaS essentially has this advanced machine learning computing capability to just crunch the data. So by running the data using advanced algorithms you're able to produce process improvement opportunities and specific actions you can take to produce a more optimal OR schedule," he says.

LeanTaaS' data analytics continuously monitors and shows how operating rooms are being utilized, the root cause of delays including first case late starts and turnover times, and identifies opportunities to improve utilization. The data analytics software also has been designed to use mathematical models to detect bottlenecks and reallocate OR blocks. And, the solution enables automated block reallocation with mobile interactions, so surgeons can release assigned blocks, request more blocks and swap blocks with fellow surgeons, and administrators can approve block requests and track activity in real time, according to Giridharadas.

And, Hess says this initiative is not a one-off project, but rather part of an ongoing effort toward continuous process improvement. After rolling out the predictive analytics tool throughout the health system's ORs, he expects the health system will next look to improve efficiencies with inpatient operations.

"So, inpatient is the natural next place to go after OR. But don't stop there, think about radiology and imaging, think about lab tests, pharmacy meds, ambulatory clinics, frankly, the canvas is blank in terms of what you can do with machine learning combined with process improvement philosophies," he says.

He continues, "Here at UCHealth, we're growing—we're growing by acquisition, by affiliation, by doing new builds of appropriate care centers—but we also already have a lot of footprint. So, whenever we have throughput issues or capacity issues, we want to turn the conversation away from how many new ORs do we need to build? Instead, we look at how do we use our existing ORs better? In this era of rising healthcare costs, we are trying to be good custodians of the national spend and we want to be able to use our existing resources better, and this is going to help us with that," Hess says.

He refers to the use of data science and predictive analytics applied to hospital operations as "game changing." "We have brilliant physicians and incredible administrators, but they are busy taking care of patients and taking care of staff. It's hard to step out of their day-to-day role and say, 'If we do x, y and z, we can move the needle.' LeanTaaS is getting to that step, and in days and weeks, where maybe we could get to in months or years, and that's the difference." ◆

Treating Big Data Symptoms in Healthcare

Big Data can either be a headache or a potential cure-all for the healthcare industry, depending on how it's managed. On the one hand, all of the information being captured from electronic health records (EHR), digitized insurance claims, physician notes, patient monitoring devices and more can aid in developing smarter data-driven insights and lead to improved patient care and treatment. Yet before being able to harness the power of all this data, healthcare organizations must first address several challenges that, if left unchecked, can negatively impact the health of the business:

- Access to and preparation of structured and unstructured data from multiple sources
- Addiction to and limitations of legacy technologies
- Deficiencies and gaps in the skills and manpower required to unify all of the necessary data for analysis at scale

For healthcare organizations looking to overcome the challenges in data scale and complexity, the prognosis looks good for those opting to incorporate data preparation solutions into their daily regimen. Studies done on the implementation of self-service data prep solutions in particular have revealed positive results with IT teams, data analysts, data scientists, and business analysts, ultimately allowing users to build and manage data products and transformation scripts more effectively and on demand.

Consider the benefits a data preparation solution can offer your healthcare organization, as outlined in a recent Blue Hill Research report:

- Empowered exploratory analytics. Simplifying data preparation for exploratory analytics makes data useful more quickly and easily than traditional solutions. By removing legacy inefficiencies and technical requirements of analytic data prep, data preparation solutions provide a superior approach for business teams for data discovery and analytic transformation without relying on IT.
- Increased productivity. The most efficient data preparation systems make existing data resources more productive across the organization. These solutions present an avenue to bring volumes of unstructured text-based and inconsistent data into a cohesive format for further analysis. By reducing the time to integrate, cleanse, and prepare data, analysts can utilize more data in important analytic tasks, such as feature construction, model construction and validation, and exploratory visualization and content augmentation.
- Raw source data on demand. Data analysts, scientists, and business users (non-programmers) can pull data from various formats and sources directly into downstream visualization and analytics tools. As healthcare service providers demand increasing visibility into internal operations, external findings, and patient monitoring device data feeds, there is an opportunity to defray demands on IT by placing this data directly into the hands of those who will need to perform the analysis.
- Improved organizational data usage. Data preparation solutions accelerate the time to clean and manipulate data and couple automated routines for anomaly/irregularity detection with visual summaries so end users can identify and fix data quality anomalies more quickly. This enables a consolidation of silos of data across health information systems and external feeds to present decision-makers with a consistent and real-time view of operations. Bringing relevant information to light in the context of the broader organization not only stands to improve operational efficiency, but patient outcomes as well.

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Using Data Analytics to Improve Clinical Performance and Its Reimbursement Outcomes: One Hospital's Experience

A. Thomas McGill, M.D. is leading an ongoing initiative at Butler Health System to leverage data to improve both clinical and financial outcomes

BY MARK HAGLAND

At Butler Health System, a 311-bed community hospital in Butler Pa., hospital leaders have come together to use data analytics to improve a range of patient care delivery processes and outcomes. Working with an analytics solution from Information Builders, a New York City-based business intelligence and integration company, Butler Health System clinical, IT, and financial leaders have been moving forward to focus in particular on examining and improving specific diagnostic and care delivery processes whose outcomes have financial impacts.

In all this, the leaders at Butler Health System are fortunate to have A. Thomas McGill, M.D., leading the charge. Dr. McGill, a practicing infectious diseases specialist, has been vice president of quality and safety at Butler Health for 10 years, and for the past four years, he has also been the organization's CIO. Thus, his title and responsibilities encompass both quality improvement and IT activities and efforts at the health system. McGill spoke recently with *Healthcare Informatics* Editor-in-Chief Mark Hagland regarding the work that he is helping to lead at Butler Health. Below are excerpts from that interview.

YOU HAVE A UNIQUE PERSPECTIVE ON ALL THIS, BEING BOTH THE VICE PRESIDENT OF QUALITY AND PATIENT SAFETY FOR TEN YEARS AT YOUR ORGANIZATION, AND ALSO, FOR THE PAST FOUR YEARS, THE HOSPITAL'S CIO. TELL ME ABOUT YOUR AND YOUR COLLEAGUES' PURSUIT OF CLINICAL PERFORMANCE IMPROVEMENT THROUGH DATA ANALYTICS.

Certainly. Especially because of my dual titles, in our analytics work, we are focusing on a combination of quality and safety improvement, as well as on financial analytics. And our particular focus has become all the metrics for which we are held accountable by external organizations—payers and regulators. We had long been working on analyzing some metrics, but the evolving mandates coming from the Medicare program and the commercial payers have particularly spurred activity here. Medicare has all its adjustment programs, and the commercial payers have their incentive programs. For example, the healthcare-acquired conditions program under Medicare penalizes a wide range of conditions acquired while patients are being treated—some of them infections and other conditions non-infectious.

For example, we started working on venous thromboembolism [VTE] prophylaxis early on. We looked at the actual costs of patients in the same DRG [diagnosis-related group]—looking at whether they had a clot or not. And we found that per case, patients with a clot were costing us $9,000. I was really surprised by that level of expense. We immediately saw something like 50 episodes or events involving venous thromboembolism, when we started doing our analysis back in 2012. So our baseline measurement was that we had found that we had been experiencing basically 50 or 60 such cases a year, and we were able to get that number down to 9 or 10. The drug Lovenox was still a brand-name drug. So when we first started, we said, OK, we're going to spend $25 a day on this prevention—we knew it was the right thing to do for the patients, but didn't know what it would

be like financially, and even financially, it was a home run to prevent blood clots. In fact, we ended up avoiding a quarter of a million dollars in costs just through that improvement.

And you just start doing these one after another, and they start accumulating. And outside of infectious disease, that's one of our best examples of where clinical care quality improvement has saved money.

COULD YOU SHARE ANY OTHER EXAMPLES?

Basically, at the turn of the century, we started doing active MRSA surveillance to find out whether patients were carriers of MRSA [the methicillin-resistant staphylococcus aureus bacterium] when they came into the hospital for care. And therefore, we wanted to know if they were carriers of MRSA when they came in, were we inadvertently spreading that to other patients and amplifying the amount of MRSA in our community? So Dr. Jernigan from the CDC [Daniel B. Jernigan, M.D., M.P.H., Deputy Director of the Influenza Division at the National Center for Immunization and Respiratory Diseases, for the federal Centers for Disease Control and Prevention] had this idea, and we bought into it and started looking at screening everybody. So we did a baseline study again: we were screening incoming patients, and made those results available to doctors considering potential antibiotic treatment. We found that our amplification rate was 25 percent, meaning that for every 1,000 people who were coming into our hospital as carriers of MRSA, 125 were going out, confirming that we were adding to the burden of MRSA in the community. So we started screening and treating for MRSA upon admission. And we didn't see a change in the burden until we had done active surveillance. We didn't affect our overall amplification rate until 80 percent of our units were under this program. And we understand that many healthcare workers move from unit to unit. What our data showed was that the hospital-based spread of MRSA can be prevented.

IN OTHER WORDS, YOU AND YOUR COLLEAGUES FOUND THAT CLINICIANS WERE SPREADING THE DISEASE INADVERTENTLY?

Yes. You would go see a patient on another floor, and you'd get it on your stethoscope and clothing, and we know that hand hygiene is imperfect, and therefore, it was easy to inadvertently spread the disease. We fluctuate between a rate of 100 and 106 now.

THAT'S EXCELLENT; YOU'RE CLOSE TO ZERO ADDED MRSA BURDEN FROM HOSPITAL-BASED SPREAD. HAVE YOU BENCHMARKED THAT RATE AGAINST THE RATES OF ANY OTHER ORGANIZATIONS?

We're aware of a hospital that got as low as 104. And they were using a PCR test, which costs $50 and gives you a result in an hour or so. We were using a culture method that gave us a result within 24 hours. We have to be frugal as a community hospital. But we found that we were able to bend the curve cost-effectively. So then the fallout of that program in the current era is that MRSA and hospital-acquired MRSA sepsis is now a quality measure, and we basically have one case every year or two, extremely low rates of that, and I attribute that to this program, in part, anyway.

I LOVE THE FACT THAT YOU'RE AN INFECTIOUS DISEASE SPECIALIST, HEAD OF QUALITY, AND CIO.

It was just a career evolution. So you're responsible for infection control, and you need data, and have to make some changes. And when I was functioning as a physician in this infection control role, I was always going down to IT or administration saying, we can do this better. So that led into my quality role. And then that led into further involvement in data and information system. And so I became the functional CMIO while I was head of quality, and our CIO announced his retirement rather unexpectedly, so my boss asked me to be the interim, and after six months, he asked me to stay on.

HOW DO CIOS AND I.T., CLINICAL INFORMATICISTS, AND CLINICIAN LEADERS, MOVE FORWARD IN ALL THESE AREAS, LEVERAGING DATA?

You certainly need the data, and someone has to turn it into information or understanding; and then this ability to make change, to change your institutional and your individual behavior. And I can tell you, you can get pretty far just by doing that. But in the absence of incentives, you sort of hit a certain ceiling. So then really, to go farther, you need incentives. So we have institutional incentives in the form of penalties or upsides from our payers. And I've been examining the projects where we've had total success or failure or so-so results, and the question is, are the incentives aligned? That's the differentiating factor. And you can do almost anything in a year, but if the incentives aren't aligned, you won't sustain it.

And then, organizationally, in the transformation of our industry that is now taking place because of the cost crisis, the ability to do this requires buy-in and capability on the part of every department in the organization. I can manage some finite number of projects, right? But to really be successful in payment reform—for an organization our size, we would have to be doing dozens of these a year, sustaining them, and going onto further dozens a year. So it can't be a special function. So what we really want it to be is part of how people function and manage.

So my perception is that certainly, the managers in healthcare, at least in our organization, were not hired with these skill sets or aptitudes in mind; and it's also true of many physicians. Medicine is an applied science, which is kind of like engineering. So the way I think about medicine now is, if these changes are fairly close to how you're practicing now and need to make an incremental change, the applied scientists are pretty good about that. But if you have to discover new knowledge to make change, as in changing care processes, only a very small percentage of physicians have that attitude. Because you're having to apply new knowledge.

Continued on page 37

Jumpstarting population health management

By West Johnson and Kathleen LePar

As the evolution toward value-based medicine progresses, many healthcare organizations are focusing on Population Health Management (PHM) as a key to achieving improvements in care coordination and costs.

There are challenges with understanding the breadth of PHM as well as where to start. While it is important to look at the full continuum of care and not look at PHM in silos, we do believe taking small, tangible steps, and then expanding on them incrementally, can result in scalable achievements at the appropriate pace and level.

In our view, population health management involves using analytics to understand and stratify specific risks and gaps in care of the chronically ill and those that simply lack the continuity of services throughout the continuum of care. Accessing longitudinal data will help us to better tell the patient story, provide a platform for standardization of care guidelines and management of patients, and allow for the population based reporting, which will provide data to evaluate and optimize the care delivered and the process by which it is delivered, identifying disparities.

Using the necessary data to target those populations and accessible services through care coordination efforts can provide optimal, proactive management of care to avoid or minimize adverse results. As a result, healthcare organizations can offer patients and consumers better outcomes, higher quality care, and lower costs through the use of effective PHM strategies.

So, how can organizations best leverage PHM in order to improve clinical, financial, and operational outcomes? See the table below for five steps to get your organization started.

The Power of PHM: Five Steps

By addressing individual gaps in care and targeting high-risk populations with preventative interventions, providers can reduce the need for such costly interventions as emergency department (ED) visits, 30-day readmissions, frequent hospitalizations, costly diagnostic tests and invasive and duplicative procedures. Through planning and implementation of a PHM strategy, organizations should focus on five specific key elements that can help address the challenges that may arise:

Staying focused drives positive outcomes

Putting time and effort into promoting better PHM will ultimately benefit all constituents of the healthcare ecosystem. Providers will move much closer to creating value-based care models. Payers can better measure quality and align their reimbursement rates. And patients can improve their health as they avoid ED visits, minimize hospital admissions and readmissions, learn to manage their illnesses, and understand the importance of adhering to medication regimens. And, of course, the whole system will function more seamlessly if patients know they are cared for not just during office visits, but on a consistent, sustaining basis.

KPMG understands the complex journey that hospitals and health systems must undergo to change and realize value. To learn more about jumpstarting your organization's Population Health Management strategy, our authors can be reached at:

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How Florida's Health First Has Leveraged Real-Time Data to Improve Hospital Operations

In Florida, Health First has been able to leverage minute-by-minute census data to forecast and anticipate capacity issues before they occur

BY RAJIV LEVENTHAL

Amid an urgent push to use staff and existing beds more efficiently, and capture more incoming patients, hospital and health system executives are continuously looking to improve hospital operations by using real-time data.

As such, Health First is using lean methods to improve efficiencies in various departments. The integrated delivery network, headquartered in Rockledge, Fla., has 900 beds across four hospitals, a large multi-specialty medical group, outpatient and wellness services, and health insurance plans.

Specifically, the patient care organization uses technology from Pittsburgh, Pa.-based TeleTracking to monitor daily hospital functions in real time and capture performance data on pull time—the length of time it takes for patients to occupy assigned beds—number of transfers, and total length of stay, as well as turnaround time for all ancillary support services, with the goal of eliminating wasted time and resources. Initially, the idea was to find an environmental services solution for bed cleaning, but then Health First operational leaders started looking at the TeleTracking software for bed placement and transport. Then came the ability to do predictive modeling, says Lisa Maples, director of centralized patient logistics at Health First.

As director of centralized patient logistics, Maples is in charge of anything to do with patient flow and throughput. Every patient that comes in to the organization—be it through the emergency room (ER), intensive care unit (ICU), or operating room (OR), for instance—comes via TeleTracking, where Maples' frontline staff then makes decisions on bed placement at one of the four hospitals. "We are trying to take a look at volumes coming into our ER. We know what's been happening historically and know what's going on now, so we we're looking at our admission percentages based on physicians working in our department, we looking at our OR schedules and our [catheterization] lab schedules, all so we have a better picture of what we think we will have as far as admissions per day," Maples says.

Working with the TeleTracking technology, Health First has what it calls "conditional discharges" that its physicians write. Those then go into the TeleTracking system, and that gives Maples' team a number of pending discharges for the next day or two days, she explains. "We take a look at all of that information and marry those data sets together," she says. "This is what we have coming in based on history and schedule, and this is what we have going out. So we try to figure out we're at as far as where we are with our current census, what is coming in and going out, and try to predict on Monday that Wednesday might be a good or bad day [for admissions], for instance. And then we staff accordingly and look at how we can work through scheduling," Maples says.

Additionally, the software, which Maples notes integrates with Health First's electronic health record (EHR) via approximately 30 interfaces, will give metrics for every patient step taken within the organization, from the time he or she comes in to the time he or she leaves. This includes, among other things: how long it took a patient to get through the ER, how long a patient stayed on floor, and how long it took to downgrade a patient. That data is then used to get information about how patients are flowing, high length of stay days, and when certain "milestones" are reached before a patient is discharged. Milestones, Maples explains, are fed from the EHR interfaces, and can include when education for patient has been done, or when medication recon-

ciliation has been signed.

This organizational effort to leverage minute-by-minute census data to forecast and anticipate capacity issues before they occur, led by Maples' team, has resulted in in 33,000 fewer hours of ED wait time, a 12.9 percent reduction in average cost per discharge and 1.5 days (19 percent) reduction in average length of stay—all this despite a 27 percent increase in total annual admissions and no additional inpatient beds, Health First officials note.

"We have lots of data, more than 300 reports, that are written and given out to the appropriate people, and that data drives the work we want to do," Maples says when asked about the difference now with data transparency compared with before TeleTracking. She adds that the frontline staff loves the visibility with the system. "They used to have to make phone calls to find out if patients will get a bed and when it might be ready. There were so many different questions, but now [our staff] has the visibility with the system so if a patient is asking them something, they know the answer for sure. They see the transparency all across the organization, which in turn makes their jobs easier," Maples says.

She adds that another added benefit of the technology is being able to get deeper views across the entire system as opposed to only for each individual hospital. "That probably made the biggest difference, being able to use this system to its truest potential," she says. Now, Health First is able to utilize all of its 900 beds as a system, thus letting Maples' team quickly figure out where a transport patient should be placed, for instance. "It gives us the ability to look across the system and use any of our beds rather than be pigeonholed at a particular hospital. That's been a great benefit," she says.

Maples says having the data that can be trusted, indeed a new phenomenon in healthcare, is extremely important for any healthcare organization. "Every one of the changes we have made, all our lean processes and changes, we could not have sustained it without the data," she says, adding that it's equally important to keep up the same level of concentration, even after achieving initial success. "Here's where we are, so now let's sustain it. You can lose focus easily. We will still send you reports and you're still responsible to make sure your team is meeting the goals, and the data will help determine if you're slipping or not," Maples says. ◆

"WE HAVE LOTS OF DATA, MORE THAN 300 REPORTS, THAT ARE WRITTEN AND GIVEN OUT TO THE APPROPRIATE PEOPLE, AND THAT DATA DRIVES THE WORK WE WANT TO DO."

–LISA MAPLES

Continued from page 33

COULD IT ALSO REQUIRE CULTURAL CHANGE AMONG PHYSICIANS?

Yes, but I would say that culture overlaps considerably with new knowledge-based change.

WE'RE SYSTEMATIZING CARE DELIVERY, THOUGH, RIGHT? AND THAT IN ITSELF IS A CULTURAL CHANGE.

I would agree. And what we're doing with the data is giving individuals and groups the data, and that is very effective. Physicians are competitive; they've always been the best in their groups. They don't want to be the worst in their groups. But you have to have the right incentives.

WILL YOU BE PARTICIPATING IN ANY MEDICARE OR COMMERCIAL ACOS [ACCOUNTABLE CARE ORGANIZATIONS]?

We haven't done that yet; we've been sitting on the sidelines to see what happens. The passage of MACRA [the Medicare Access & CHIP Reauthorization Act of 2015] is sort of forcing the issue. We do have gainsharing agreements with two of our payers now. And our area is one of the mandated ones for total joint replacement. But we haven't done it yet; it takes a lot to get all the systems in place. And to me, the infrastructure costs versus the savings—you know, it's been our costs and the payers' savings. And when you're following the money, that's the way it's ended up so far. And we're frugal here, so we've been watching and trying to figure out where the niches are, where this is practical.

And we're a self-insured organization, at risk for our own employees' health status, and so that's a population we're actively working on in terms of wellness and related areas.

GOING FORWARD, WHAT WILL THE NEXT TWO YEARS BE LIKE FOR YOU?

Our health information system is Meditech Magic, and we've had it for 24 years. So that will be an all-hands-on-deck effort for that one. But we've also formed a PHO, so with quite a few of the independent docs in our community, as well as our employed docs; so we're working on performance improvement through that, to demonstrate effectiveness. So our goal there would be to get some different kinds of contracting, to acknowledging our cost-effectiveness and clinical effectiveness.

AND THAT WILL BE INVOLVING SOME RISK, CORRECT?

Yes, involving some upside risk, and I think you've got to take some downside risk as well, and pick a number you're comfortable with failing on. ◆

Driving Growth through Big Data: A Q&A with Weill Cornell Medicine

In the new value-based health economy, it has become essential for health systems to evaluate new strategies for driving revenue growth. An emerging strategy proving effective for many organizations is an increased focus on strengthening physician networks, with specific emphasis on building stronger referral networks and reducing and capturing network leakage.

Craig Ariano, Associate Director of Finance & Strategy at Weill Cornell Medicine discusses how their physician organization is driving a continuous year over year growth rate of 10%, in a highly competitive environment, in part by leveraging the services of IMS Health, a leading healthcare data and analytics provider.

We understand Weill Cornell Medicine to be a data-driven decision making organization, but will you please tell us a little bit more about the organization and your role there?

Located in the heart of the Upper East Side's scientific corridor in Manhattan, Weill Cornell Medicine boasts a large physician organization that includes over 1,200 physicians across a wide range of primary care and medical sub-specialties. Today these physicians serve communities not only in the Upper East Side, but also the West Side and Lower Manhattan, as well as neighborhoods in Brooklyn and Queens**.** As the Associate Director of Finance & Strategy, I am responsible for supporting all of the strategic planning initiatives for the Physician Organization through the integration of business intelligence and reporting. I manage a team of about 30 employees, which includes a mix of database developers, reporting analysts, financial analysts and strategy professionals. I work directly for the CFO and COO, who rely on me and my team to report on market trends, assist with strategy, and help quantify decisions regarding expansion and similar strategic initiatives.

What were your business objectives for partnering with a third-party data supplier?

Our first interest in IMS Health was to understand what opportunity exists to capture more business from our existing patients. In addition, we also wanted a clearer picture as to what percentage of our business was being referred in by outside physicians. We know that approximately half of our business comes from physician referrals, so understanding where these referrals are coming from is extremely important to us.

Our specialty care physicians are competing for referrals with several other major healthcare groups that we compete against in Manhattan alone, and these are basically big hospital systems as well – all with good brands and all with great physicians – so fundamentally we were looking to IMS Health to help us understand referral patterns into and out of our system, as well as the surrounding competitive landscape, so that we can grow more strategically.

How has bringing in outside data helped you achieve these objectives?

Before IMS Health, we had no visibility into the physician or competitive landscape of the city. Now we are able to quickly download data and put on a map every single physician for every specialty in the whole New York City market. We can easily identify which physicians we should pursue for recruitment efforts based on geography, specialty, patient volume, payer mix, and the relationship we currently have with them.

We also have better insight into physician referral patterns, including our own. Currently there is no requirement to include the information for referring physicians on our claims data, so only about 20-25% of the data in our system has this information. We find that the additional data we're now getting fills in the other 75-80%, allowing us to see a clearer picture of how our patients are flowing both between physicians within our own system, as well as from physicians outside of our system. It has really filled in many of our blind spots and improved our understanding of the market as we look to grow.

What process did you go through to validate the quality of the vendor-supplied data?

Our objective was to perform an unbiased analysis of their data offering, so we decided not to give IMS any of our internal claims data. Instead, we ran two concurrent sets of the same physician data – one from our EPIC system and one from IMS Health's system, to examine side-by-side the information on patient counts and volume statistics for our physicians. Over

time we ran some statistical correlations between the two data sets. What we found was the coefficient correlation between the two sets proved to be about a .9 (where 1 represents the strongest correlation), and that is with the caveat that there would not be claims data for our physicians seeing self-pay patients, which includes a significant international service. Ultimately what we found was that IMS Health's data for Weill Cornell physicians was almost as good as if we looked at the data from our own systems. With that being true for our physicians we felt confident that looking at non-Weill Cornell physicians, we could trust the data accuracy from IMS Health.

Tell us about the relationship between Weill Cornell Medicine and IMS Health and where you see it going next?

IMS Health is helping us identify ways to answer the questions driving our strategic decisions. In addition to the online web interface, the IMS Health database system is robust, and it's been growing on a consistent basis that has been timely with our needs. As we've evolved in our strategic thinking, IMS has continued to add more data at the right time.

As we continue to look to expand into different areas, IMS data is going to help us figure out where to go and which relationships we should pursue, such as those with high-value physicians to bring into the organization. We also plan to use the software to help us identify outmigration patterns of patients and leakage, so we can work to reduce incidents where our patients are going outside of the system.

And finally, we plan to take the IMS data and build it in into our enterprise business intelligence solution so that we can look at patterns and trends over longer periods of time and drill down with some custom dashboards.