Duke University Health System gets smarter for its patients

Smart is…
*Delivering more personalized care, stimulating a deeper level of patient engagement in healthcare management*

The instinct to innovate has long been a part of Duke University Health System’s organizational DNA. Ahead of the curve in the healthcare industry, Duke recognized the need for a new level of patient engagement for healthcare transformation initiatives to achieve their full potential. What makes such engagement possible is a deep personalization capability enabled by powerful healthcare analytics. It’s part of Duke’s strategy of becoming a continuously learning healthcare provider—and a reason Duke’s quality ratings consistently rank in the 100th percentile nationally.

By drilling down into its millions of clinical records, Duke was able to develop a predictive model for identifying high-risk scenarios, and use those insights to improve training, which ultimately improves patient safety.

As the need for healthcare transformation becomes more apparent, some of the more prominent themes that have begun to emerge are an increased focus on prevention and results, the need for safer practices and a more active role for the consumer in making healthcare choices. Steady growth in the number of healthcare transformation initiatives—involving both large and small providers—reflects an increased focus on these imperatives by many healthcare providers.

Among a subset of the most innovative providers, the quest for a better way to deliver healthcare services has been an ever-present goal. North Carolina’s Duke University Health System is one such organization. Duke prides itself on a deeply rooted culture of innovation that manifests itself in every part of its organization, from clinical operations that are consistently ranked among the top 10 in the United States, to world-class academic and research capabilities that drive breakthrough discoveries.

A foundation for change
About four years ago, Duke framed an ambitious plan to change the way it delivered healthcare. As with other healthcare organizations, an important part of Duke’s transformation would involve the addition of a series of new clinical information capabilities, such as physician order entry. What made Duke’s approach different—and, in many ways, ahead of its time—was its strategy of implementing new capabilities in adherence to a broader transformation framework. But this isn’t about technology as much as it is a set of guiding principles that Duke sees as the foundation of the future of healthcare delivery.
Business benefits

- Increase in patient engagement and satisfaction through proactive health management
- Improved clinical outcomes and increased patient safety through the ability to define best clinical practices
- Improved ability for patients to manage chronic diseases through personalized health coaching
- Improvement in workflow efficiency
- Increase in NIH grant funding due to improved research capabilities

“The first is the principle that meaningful changes to healthcare delivery can occur only when individuals are fully engaged in the experience—and not only when they’re sick. For Duke, this means giving its patients the means to proactively manage every aspect of their health by keeping them informed on a personal level and helping them to make the right decisions. The second principle is that Duke itself needs to become a continuous learning organization, able to systematically adapt its practices by rapidly determining which treatments and approaches work best—and which don’t—and changing course as needed. What binds these two qualities together is the essential role that intelligence plays in making them work, since it provides the basis for personalized interaction with patients, as well as the “brains” required to continually identify and apply the most effective clinical practices.

Duke CIO Asif Ahmad had been down the healthcare transformation road before. Brought on board to direct Duke’s transformation activities, Ahmad was determined to apply the lessons and insights he had acquired in previous projects with similar goals and challenges. Technology issues were only a small part of the equation. Perhaps the biggest overarching issue was the need to establish support for changing deeply rooted practices and building confidence among key stakeholders that such an ambitious goal could be achieved. To that end, Ahmad took a methodical series of steps that ultimately proved integral to the success of the project.

Smarter healthcare: Strengthening patient engagement through personalization

**Instrumented**
All information related to a patient’s clinical activities is automatically stored in a central data repository, accessible by health analytics tools.

**Interconnected**
Patients (and eventually caregivers) can access and manage health information and services from a single healthcare portal.

**Intelligent**
Duke’s health analytics system continuously updates best clinical practices for specific illnesses, enabling physicians to deliver the optimal course of treatment.
Solution components

**Software**
- IBM Cognos® BI
- IBM WebSphere® Portal
- IBM InfoSphere™ DataStage®
- IBM InfoSphere QualityStage™
- IBM Lotus® Forms

**Servers**
- IBM Power Systems™

**Services**
- IBM Software Services

“The inside story: Getting there

Revising the governance model
One of Ahmad’s first actions was to realign Duke’s IT governance model. The most basic tenet behind Duke’s new thinking was that enterprise-wide transformation requires an IT governance framework that spans the entire Duke organization. Ahmad also maintained that as the mission focus of IT shifted from providing support to being “an innovation performer,” driving innovation across the enterprise, the profile of IT within Duke’s executive leadership had to reflect that. This resulted in two important changes to Duke’s IT governance model. The first was a consolidation of its department-specific IT resources into a new entity known as Duke Health Technology Solutions, headed by the CIO. The second was to make the CIO report directly to Duke’s chancellor, effectively giving IT an equal footing with the financial and operational parts of the Duke organization.

Building credibility
Ahmad realized that building a foundation of credibility was an absolute prerequisite to gaining the support he would need to pursue a broader change agenda. His strategy was to start small—yet all the while working within the big picture. Over the first several months, he and his team initiated a series of point projects, in the process assembling a string of successes that gave key stakeholders a sense of what could be accomplished, and in so doing laying the groundwork for driving broader changes.

Give the patients what they want
Although Ahmad and his team had made the case for enabling closer consumer engagement, the specifics—what that would actually mean in terms of services and capabilities—had yet to be established. To gain this insight, the team went straight to the best possible source: Real patients. In addition to conducting a series of focus groups, Ahmad’s team also worked closely with Duke’s Patient Advocacy Council (a group of patient volunteers who meet with clinical leaders on a routine basis) to elicit both ideas and feedback. Above and beyond the specific wish list that came back from the research was an overarching theme: That while information is an essential building block of enabling consumer involvement, intelligence—knowing what information to deliver and when—is the key to deep and lasting consumer engagement.
These lessons found their expression in the HealthView Portal, Duke’s one-stop source of healthcare information and services for its patients. HealthView synthesizes information from across the Duke enterprise for presentation through a unified portal interface that provides access to services such as the ability to request and book appointments, pay bills, view personal medical information and history, and complete appointment registration in advance of appointments to save time. Duke also sees HealthView as an important communication conduit, and an ideal venue for leveraging intelligence. In the recent flu season, for example, Duke was able to identify 120,000 patients at risk for complications from the H1N1 virus and communicate a personalized prevention strategy to them. In the same session, patients could then learn which clinics had stocks of vaccine and then schedule an appointment for a flu shot. Similarly, HealthView provides a channel through which primary care physicians can coach their patients on how to stay healthy. It’s through experiences like this that the seeds of deeper consumer engagement are planted.

**Learning through health analytics**

In Duke’s drive to become a continuous learning organization, health analytics plays an important role. Its impact is especially powerful in the area of chronic disease management, a health issue expected to mushroom in importance in the coming decades. At its most basic, Duke’s health analytics environment enables it to identify patients with chronic conditions and to intervene through a primary-care setting to help them manage the condition. The framework provides even more powerful tools for caregivers, such as the ability to guide clinicians to best practices for specific conditions based on the tracking of real-world results (such as Duke’s database of some 46,000 diabetes patients). If the course of treatment is found to be less than optimal, built-in triggers alert the physicians to conditions that need immediate attention that may even change the course of treatment to ensure the best possible care, to minimize the need for hospitalization and to keep patients healthy and functional.
Ahmad sees an even stronger example of continuous learning in the way Duke tracks events that could have happened—such as near misses—and uses that information to apply predictive modeling that helps to flag high-risk future scenarios. “What we’ve done with quality and patient safety analytics is similar to what the airline industry has been able to do, which is to model scenarios and educate our staff based on the scenarios,” explains Ahmad.

The success of Duke’s efforts to deepen engagement is evident in the speed with which patients have adopted it. After growing from zero to 30,000 users in less than three months, HealthView is now used by more than 150,000 patients, roughly one third of Duke’s overall patient base. Thus far, Duke has collected US$16 million in co-pays through the portal. These figures suggest more than a good start for establishing the closer patient engagement necessary to drive future improvements in healthcare delivery.

While difficult to quantify, Duke’s investments in health analytics are clearly helping to fulfill its aspiration of becoming a continuous learning healthcare organization. Its ability to continually grow and adapt its base of best clinical practices is real, as are benefits such as improved outcomes, patient safety and overall high quality (with Duke consistently ranked in the 100th percentile). As its transformation journey continues, Ahmad expects intelligence and engagement to remain at the center of future innovation efforts. “We’re establishing the foundation for delivering smarter and more engaging healthcare services for our patients,” says Ahmad. “While innovation has always been part of Duke’s culture, advanced technology and insights are helping us reach new heights.”
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