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Hospitals Discover Success with Data Analysis as Cutting-Edge Innovations Help Streamline Operations

by Triona Guidry



The age of information overload is becoming the age of information overdrive.

Across the United States and abroad, hospitals are streamlining operations by gathering more precise data and analyzing this information in new and surprising ways. Innovations from the world of consumer technology are changing how we enter, manipulate, and respond to information, as well as how we communicate it to others.

As in other industries, health care is moving away from the traditional computing model. The days of basic clients and servers sit by the wayside as we transition to a world of continual interconnectivity. The consumerization of information technology (IT) is everywhere, as witnessed by the voracious demand for tablets, smartphones, and social media.

Consumer IT is all about data: instant access and instant gratification. But in health care, data collection and analysis is often limited to mimicking old methodologies, such as creating exact electronic duplicates of paper-based records. As hospitals are burdened with an ever-increasing amount of data, these obsolete procedures can falter and fail.

"If all we do is digitize the information, nothing much will change," says Bill Crouse, senior director of worldwide health for Microsoft. "It's what you do with the info that makes all the difference in cost-quality analysis and other issues in health care. Don't be deluded

into thinking that once you have an EHR [electronic health record] or HIS [health information services] system, you are done.”

Instead, hospitals are finding creative ways to apply these technologies to perennial problems. In the process, they're discovering incredible new realms of possibilities for data analysis and business intelligence.

Case Study: Geriatric Care Provider

Crouse points to Microsoft customer Baycrest, a Toronto-based hospital and research center that focuses on aging patients and brain health. Using a combination of Office 365, LinkExchange, and SharePoint, Baycrest reduced costs by integrating operations and unifying communications to create a seamless experience across teams, individuals, and patients.

“They decided it was costing a fortune to create new forms,” Crouse explains. “All the forms had commonality, but every organization had its own forms, and it could cost \$20,000 for a new form. Instead, we put all their form templates in the cloud and made them available to all the hospitals in their federated region. Any small organization or clinic can go into that form library and customize the templates for their own use.”

Expectations and Demands

Crouse mentions how customer demand is a driving force in adopting these new technologies. “Patients want real-time,” he says. “They go on the Internet and search for it. In every other industry, they have an expectation of instant communication, collaboration, and transactions, and then they come to health care and hit a wall.”

Clinicians and staff want real-time, too. Hospital operations require an incredible amount of data input, so hospitals need multiple ways of entering information. As the line between consumer and business IT blurs, multiple devices with which to enter data are also needed. A single smartphone can be a conduit for an amazing amount of data. Because clinicians and staff are familiar with these devices, less training is required.

The information collected by hospitals has moved far beyond text-based records that require exact adherence to particular templates or syntax. Instead, information can be entered freeform, then extrapolated and analyzed by algorithms and artificial intelligence (AI). Some of the machine intelligence used on the back end resembles that used by search engines to parse the Internet's rapid flow of information. Voice and video technology are becoming increasingly important parts of hospital datasets. Why waste valuable time struggling to describe a patient's condition in words when an image says it all?

However, modern data acquisition consists of more than merely attaching a few images or videos to conventional text-based records. Touchscreens and contemporary graphics add to the ways in which information can be made not only instant and intuitive. Think of the potential of applying today's video game technology to health care. Crouse describes other hospital customers who are using business intelligence combined with Microsoft Silverlight and similar graphics technology. When your kids are playing their game consoles, they may very well be preparing for their future careers.

Real-time monitoring and alerts make data relevant in ways few could have foreseen just a decade ago. Hospitals are combining global positioning information with public health data, and they're using search engine queries to create real-time alerts for epidemics. The results are correlations that might not otherwise be apparent, leading to novel approaches and unexpected findings. These constant streams of information can be consolidated into the equivalent of a consumer's news feeds—except instead of reading celebrity gossip, you're improving patient care.

The Power of Partnerships

Collaboration is another piece of the data analytics puzzle. It's not enough to merely collect information, or even to collect good information. If you're not sharing your results across your organization, you've only scratched the surface. When seemingly isolated pieces of information are put together, patterns begin to appear, and that's when the potential of modern data analytics gets really exciting. The effect spirals upward as organizations share across regions and countries until global patterns of health care become apparent.

Can such vast amounts of information be consolidated into usable forms? "We don't overwhelm you with what you don't need to know," Crouse says of Microsoft's solutions. "Our customers are creating dashboards to display data in ways that make it immediately comprehensible. We use identity and access management combined with machine learning on the back end to bring forward only that which is timely, relevant, and important to the user in question."

While hospitals and other organizations are at the forefront of these emerging technologies, the impact can be felt across the healthcare spectrum. Small physicians practices used to struggle to afford server-based solutions designed for larger organizations with wider wallets. Today, they can access the same cutting-edge tools with little more than basic netbooks.

"[Cloud computing] makes us more operationally efficient," says Jackie Hautzinger of Pearl Health Care Services, a company in Glendale Heights, Ill., that is replacing its software-based solution with cloud technology. "Fewer workarounds when we move information from one system to another means fewer steps to get to the end result. The newer solutions seem to be more user-friendly, and you can see the results instantaneously."

Previously, Hautzinger's firm relied on a basic LAN and a software solution that became more obsolete as time progressed. When the company faced a migration to a new operating system, the need for change became apparent. In the process, they discovered they'd be gaining the same capabilities as larger organizations. The decision, Hautzinger says, was win-win.

Like Crouse, Hautzinger is being asked by customers for these new capabilities for reasons that include avoiding the hazards of inaccurate data entry. "If complex forms are entered incorrectly, it affects our reimbursements as well as the quality data reported," she says. "This gives you that real-time quality check, which means more accurate data and saved time in the office afterward."

The rapid pace of IT means solutions are often implemented before the downsides can be fully assessed. With so much information flowing through so many channels, security can be a challenge, as we've seen with the recent phone-hacking scandal in the United Kingdom. The problem with using consumer technology for business purposes is that it's not designed out of the box to be locked down or protected with policies. Kludged efforts are doomed to fail, but integrated solutions exist to bring consumer mobile devices into the hospital's protective fold.

Safety and Security

Many healthcare data breaches involve information stored on physical hardware taken offsite, often with permission. In one of the biggest healthcare data breaches of 2011, the records of 400,000 patients of South Carolina's Spartanburg Regional Healthcare System were compromised when a desktop computer was stolen from the car of an employee who was authorized to have the system. Private clouds, account management, and de-identification of data can help mitigate such risks.

Outages at high-profile cloud vendors such as Amazon raise similar questions of reliability. This spring, Amazon's EC2 and RDS services were disrupted for significant periods, and some customer data were lost. In a hospital setting, such interruptions can literally mean life and death.

But is there a lingering reticence to adopting new technologies because of these concerns? Not at all, says Microsoft's Crouse. "Ten years ago, how many people were buying online? Now everyone does it. Eventually the benefits outweigh the risks."

Social media is another avenue of exploration, not just for patient interaction but also for research and collaboration. Compared to traditional research models, the online global community offers unique promise for studying rare diseases and sharing data about population health. It's similar to citizen science, in which average people submit data that scientists can use in their research. Engaging patients where they are, and using the information they provide to offer better support, is at the heart of health care.

However, social media may prove to be the biggest risk of all. Security company Sophos found that malware, spam, and phishing attacks via social networks have all risen significantly in the past two years. Worse, because many victims don't know they're infected, the numbers are likely much higher. With 20 to 40 percent of medical devices already networked, the likelihood of increasing incidents seems almost inevitable.

Healthcare providers in the United States can look at the best practices of other industries and countries for inspiration. We have a long way to go in becoming completely electronic, although numbers are increasing under healthcare reforms and the HITECH Act. According to a study by the CDC, 56 percent of outpatient physicians have no EHR adoption at all, while only 6 percent have fully functioning EHR. It will take even longer before some organizations have a chance to try these new technologies.

Still, the future looks promising. "Given a choice," Crouse says, "most organizations would like to have IT work like cable TV: plug it in, subscribe, pay by month, done. That vision I now see on course for actually happening."

By the Numbers

- More than 70 percent of healthcare institutions planned to implement cloud computing in 2010. (Accenture)
- Smartphones are used by 94 percent of physicians to communicate and access medical data. (Spyglass Consulting Group)
- An average of 82 days passes between breach discovery and notification to Health and Human Services. (Redspin)
- Sixty-five percent of all records breached resulted from a laptop or portable device. (Redspin)
- Annual increases in attacks via social networks in 2010:
 - spam—67 percent
 - phishing attacks—43 percent
 - malware—40 percent (Sophos)
- Outpatient EHR software adoption in 2009:
 - 56 percent—no EHR adoption
 - 21 percent—basic EHR adoption
 - 17 percent—partial EHR adoption
 - 6 percent—fully functional EHR adoption (CDC)

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