Managing the Explosion of Medical Data

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Imagine having the insights and opinions of hundreds of customers or product experts easily at your disposal before making a major purchasing decision — rather than relying on the recommendations of a handful of people.

That’s the benefit of big data — enormous volumes of information that organizations are generating through applications, databases, social networks, sensor networks, scientific research, medical records, video and photo archives, and other sources — and the associated analytics that can be used to make decisions based on the analysis of the data.

Healthcare providers, like organizations in other industries, are beginning to leverage big data as an increasingly important asset. But the explosion of data, fueled in large part by the growth of electronic medical records (EMRs), is presenting significant challenges for healthcare IT organizations.

One is how to manage and store all of this data, including EMR databases. A key issue providers are facing is how to ensure that the data they possess is secure. Another challenge is making sure that they are in compliance with regulations such as the Health Insurance Portability and Accountability Act (HIPAA).

Another big issue for most healthcare providers is dealing with a siloed storage infrastructure that makes it difficult for institutions to share medical records across various departments.

Fortunately, solutions are available to help healthcare organizations better manage their growing data resources. This white paper looks at the explosion of healthcare-related information, and how organizations can address the significant challenges of managing and securing these vast resources.

Growth of Medical Data

Data volumes are growing in many industries, but the rise in health-related information is especially significant. Much of this is driven by the emergence of EMRs.

While many hospitals, clinics and other medical practices still use paper-based records for recording patient information, federal and state governments, insurance companies and medical institutions are promoting the adoption of EMRs because of the efficiencies enabled by electronic storage and access.

The volume of EMRs is expected to grow significantly in the coming years as more facilities adopt electronic records and as healthcare providers rely more heavily on mobile applications and devices such as tablets and smartphones to gather patient records.

The proliferation of mobile devices and the bring-your-own-device (BYOD) trend are expected to add to the growth in information.

In addition, the use of big data and analytics in the healthcare sector continues to grow. According to a 2011 report by McKinsey Global Institute, entitled “Big Data: The Next Frontier for Innovation, Competition and Productivity,” big data can help improve the effectiveness and efficiency of healthcare as an entire system.

“The use of large data sets underlies another set of levers that have the potential to play a major role in more-effective and cost-saving care initiatives, the emergence of better products and services, and the creation of new business models in healthcare and its associated industries,” the report states. McKinsey divides the “levers” into five broad categories: clinical operations, payment/pricing, R&D, new business models and
public health.

Healthcare systems in the U.S. and beyond have shown early success in their use of big data, according to the firm. The fiscal pressures imposed by increasing healthcare costs have motivated the creation of multiple pilot programs that use big data and its analytical and management levers to capture real medium- and long-term value.

The healthcare system in the U.S. has four major pools of data, the study notes: provider clinical data; payer activity (claims) and cost data; pharmaceutical and medical products research and development data; and data related to patient behavior. Contributing to the big data trend is the strong push toward electronic records.

Benefits of EMR and Big Data
The abundance of data, including EMR, can lead to a number of benefits for healthcare providers, including more cost-effective ways to store information (compared with paper-based records), greater accuracy of information and improved workflow.

By storing patient information electronically through computerized medical records, healthcare providers can complete patient charts more quickly, potentially speeding up the process of scheduling and treating patients.

Gaining instant access to EMR enables healthcare professionals to chart patients during direct encounters, rather than hours later, and that can improve the accuracy of patient health records.

Furthermore, EMR storage can help prevent filing errors and eliminate any threat of losing patient health information in an emergency, provided that the information is automatically backed up.

And EMR can also help reduce costs for healthcare providers because electronic records take up less space than paper-based files and are generally easier to access than paper records.

A February 2012 study by research and analysis firm HIMSS Analytics and research, technology and consulting firm The Advisory Board Company, documents some of the benefits experienced by hospitals that have implemented advanced EMR systems, in the areas of clinical quality, patient safety and operational efficiencies.

The study gathered data from 33 CIOs at Stage 6 or Stage 7 EMR Adoption Model hospitals nationwide and found, among other things, that hospitals with advanced EMRs reported achieving benefits such as reductions in adverse drug effects and improvements in other patient-safety indicators. In addition to clinical benefits, hospitals reported achieving operational and administrative benefits.

Beyond EMR, big data and data analytics can deliver a number of benefits to healthcare companies, including far more insight into patient treatments, drugs, medical conditions, medical procedures and other areas.

Ultimately, big data, EMR and the associated analytics can give providers the ability to make better healthcare decisions and provide enhanced health services to patients.

Data Management Roadblocks

- Gathering the data, which can come from a multitude of sources
- Organizing the data so it can be treated as one entity
- Securing the data from all the potential threats
- Analyzing the data to derive the most value

Potential Roadblocks
Healthcare organizations need to overcome several challenges to managing big data and EMR, such as information security and regulatory compliance and providing access to data on demand to a growing number of user devices.

Data security is especially important to healthcare companies, given the sensitive nature of patient records and the requirements that this information remain protected at all times.

Storing and providing access to EMRs opens up the risk of inadvertently giving access to people who are not authorized to view this information. HIPAA provides for standards that are meant to secure records and sets rules for disclosure, as well as disciplinary procedures for inappropriate disclosure.
There is always the threat of attacks that can expose records, and the more data organizations have, the bigger the target for intruders.

To thwart potential attacks and keep EMR and other data safe, IT at healthcare organizations needs to take a comprehensive approach to setting security policies and implementing technologies such as intrusion detection and prevention systems, firewalls, vulnerability scanning, disk encryption, network data-loss prevention and other products.

In addition to security, healthcare organizations must deal with the challenge of making it easy for departments to share information on demand. Today’s siloed storage infrastructures make it difficult to share data across departments, because data is often isolated from other areas. This frustrates doctors and nurses who need access to this information in order to provide patient care in a timely manner.

In addition, the infrastructure in place at many organizations is more difficult to scale and manage, resulting in higher costs and poorly utilized resources.

Fortunately, solutions are available that can help healthcare organizations address the challenges they face and better manage their EMR databases and other growing data resources.

A Success Story
Some organizations are successfully using technology to deal with the explosion of electronic medical records.

KishHealth System, a nonprofit, community-owned health system in DeKalb, Ill., that consists of two hospitals and several specialty clinics and local doctors’ offices, is aiming to become as paperless as possible and move toward EMR.

KishHealth System deployed MEDITECH EMR software to enable digital medical records for its 250 physicians and 1,300 employees.

In addition, like many other healthcare providers, KishHealth System is using digital imaging for X-ray computed tomography (CT), magnetic resonance imaging (MRI), and other imaging applications. These images are stored in picture archiving and communication system (PACS) solutions.

By replacing hard copies of images, PACS provides improved access to records, can interface with other medical systems such as EMR, and can be used to provide workflow automation to manage patient exams.

When the storage system KishHealth was using for PACS approached capacity, it began evaluating its future storage needs. The project initially began as a way to upgrade storage for PACS, but it quickly expanded as KishHealth System learned how having better storage capabilities could also help improve the performance of its EMR system.

Managers wanted to obtain a system that could automate storage-tiering to help the organization improve the response times of its MEDITECH-certified EMR solution. KishHealth’s existing storage solution was divided into separate systems for different tiers of storage, making it difficult to move data between tiers and also requiring all of the storage for an application to use the same storage tier.

KishHealth implemented HP’s MEDITECH-certified 3PAR T400 Storage system, which gave the organization the flexibility and scalability it needed. In addition, KishHealth deployed an HP StoreOnce D2D4324 Backup with HP Labs-developed deduplication. The HP StoreOnce system backs up and deduplicates MEDITECH data, and then sends it to a secondary data center, where KishHealth also deployed an HP 3PAR F400.

The organization had also been using HP LeftHand P4000 for its VMware View virtual desktop infrastructure (VDI), and is moving its VMware View VDI solution to the 3PAR storage. This will help improve the response times of desktops and reduce wait times for patients.

KishHealth System saw an immediate increase in performance with the new 3PAR storage. Among the IT improvements that KishHealth System experienced were reduced management requirements for its storage system; the elimination of system performance decline during backups; and the addition of disaster recovery capabilities to help ensure system uptime. The business benefits included reduced storage operations costs for PACS, reduced storage operations costs for EMRs, and 60 percent faster MEDITECH EMR response time.

KishHealth is using thin provisioning on the 3PAR solution to create a centralized pool of
available storage, rather than allocating storage to specific applications. Thin provisioning has cut the allocated storage by 62 percent.

For its PACS storage, KishHealth deployed an HP IBRIX X9320 Storage system. Upgrading to the IBRIX has relieved capacity issues on PACS and provided room for years of growth.

For healthcare organizations such as KishHealth System, the reliance on EMR will continue to grow. Effective management of electronic records is essential to ensuring that information is secure, reliable and can be shared among healthcare users who need access to the data.

When it comes to managing EMR data, the stakes are high for healthcare institutions. Proper use of EMR can lead to improved care for patients and more efficient operations. It’s critical for organizations to implement the necessary technology and policies to ensure that they are optimally managing these burgeoning information resources.

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1 HP case study: “KishHealth System speeds delivery of medical records with HP Converged Storage”