Mission Possible: Better Population Health Management

As accountable care organizations take off, new opportunities for improving patient outcomes are emerging. But it will take a combination of technology, processes and fresh ways of thinking to turn them into reality.
Analysis In the Accountable Care-Era

The era of accountable care organizations has begun, fueled by the Affordable Care Act and EHR incentives under the HITECH Act, which sparked the investment of billions of dollars to digitize U.S. healthcare system’s clinical data. The end game, of course, is population health management: driving better patient outcomes through analysis of clinical data.

But it takes more than clicking “Install” and starting up sophisticated data systems to achieve those better outcomes, which ultimately will slash healthcare costs if policymakers are correct in their assumptions.

This three-part guide, we hope, will put ACO IT staffers and data scientists on the road toward quality analytics for population health management. First, data architect Trevor Strome discusses how to design data queries that result in actionable clinical decision making.

Next, Joseph Kim, M.D., asserts that data analytics can help prevent disease and improve bedside care. This is no small argument; many physicians feel that their instincts, common sense and wits trump data systems—and indeed individualized patient care does require the synthesis of experience, context and technology assistance to create the best treatment plans. Kim explains how EHRs and analytics could help physicians prevent venous thromboembolism, or blood clots, among hospitalized patients under their watch. He explains how analyzing EHR data could generate “report cards” that show which physicians need...
assistance in following protocols known to prevent clots.

To close, IT consultant John Gaasedelen delves into the politics and technology of health data storage relative to ACOs. Healthcare providers are not only going to have to unlearn old competitive ways and share data—they’re going to have to put their heads together for the betterment of their common patients’ health. His idea for technology to help get these new processes off the ground? Cloud storage.

We hope these articles inform your IT initiatives and give you sound arguments when lobbying for funding from your hospital leadership.

Don Fluckinger
News Director
SearchHealthIT
Old Rules for New Data

Healthcare analytics comprises the system of tools, techniques and people required to consistently and reliably generate accurate, validated and trustworthy business and clinical insight.

Data, then, is the raw material of analytics. Therefore, high-quality data—and the structures and processes in place to achieve it—is essential for obtaining valid insight into business and clinical operations.

Healthcare providers have always collected and relied on data. Before the advent of affordable home computers and the near-ubiquity of health information technology, however, data in healthcare was mostly stored in paper charts and was difficult to access.

The process of accessing data has changed dramatically at most healthcare organizations. Data is now being generated and used almost continually as clinicians, administrators and analysts rely on health IT systems for providing patient care, conducting research and quality improvement, or managing facilities and practices.

Patients, too, add to available data with their mobile health apps, documenting and managing their health and health-related lifestyle choices. This flood of data in healthcare—and many other industries—is what prompted the term big data.

Data stored in source systems, data marts, enterprise data warehouses or other storage formats is very rarely useful on its own. Just like any raw material, data must be processed in order to be useful. This processing is how data starts to become the information and insight that are needed to understand the operations of a healthcare organization.

When a quality improvement specialist, executive or clinician asks for data, the request is rarely for just data. Most people making such requests are not actually asking for a dump
from the database, unless they need the raw data for their own analysis. Requests for data typically result from a need to better understand a problem, identify quality and performance issues or evaluate patient outcomes and the effects of quality improvement activities.

To make the most of data requests and help clinicians and other leaders in provider organizations effectively devise quality improvements, it’s important to frame the request with a few questions.

- **What to do with the data?** How can we begin to turn untapped data into meaningful insight that enables better administrative and clinical decision making? The first step in understanding an organization and its processes is knowing the data itself: its context and how it relates to the business.

To what processes, workflows, outcomes, patient-generated data or other measures does the data correspond? To provide meaningful insights that help decision makers, analytics must use data that accurately reflects the status of patients and the performance and quality associated with clinical and business workflows.

It’s often said in healthcare settings that “you can’t manage what you can’t measure.” Organizations need to ensure that the data being worked with is an accurate reflection of what they are measuring. For example, if data is storing emergency department length of stay, exactly how are the start and end points of emergency visits defined?

- **How is the data stored?** In what kind of system is the data kept, such as an enterprise data warehouse or other format? How is the data physically stored on the database? Is the data type stored by integer, character or date? How might that storage format constrict what can be done with the data?

At the database level, the data type that’s assigned to a field controls what kind of information can be stored in that field, such as number, words, character strings or a selection of menu choices. This helps to ensure the integrity of stored data so that when the data is read back from the database, the software knows how to interpret it.
What is the data type? Regardless of how data might be physically stored in a database, it’s important to know what value the data represents in real life. This knowledge allows for meaningful analyses of the data. If the type of analysis performed is not appropriate for the data type or what the data represents, the results will likely be nonsensical.

Given the type of data and storage, discretion must be applied when deciding the kind of database manipulations and mathematical operations to be performed so the results are worthwhile. For example, just because data is stored as a numeric data type on a database does not mean that all numeric operations can be applied. Data on ordinal triage acuity—the treatment of patients in an order based on level of injury—may look numeric, but it would be an error to average such scores. The values in this case are used only to establish a ranking order.

What is the problem? Critical to any useful analytics is an understanding of what clinical or business problems decision makers need to solve. With the availability of large volumes of data, and relatively inexpensive computing power that can perform deep data analysis, there’s a temptation to take the “shotgun approach” and unleash all available tests and analyses on a data set. I don’t mean to discourage this; such data explorations can reveal insight, uncover unknown relationships in data and certainly satisfy intellectual curiosity.

The end result of analysis, however, must be information that drives decision making and enables clinicians, administrators and quality improvement stakeholders to take appropriate action to achieve the goals and objectives of the organization. As my favorite high-school math teacher always said, “Make sure you answer the question.”

Healthcare organizations are generating and using unprecedented volumes and varieties of data. Yet despite advances in data collection, management, analysis and insight-generation, basic principles about data analysis still (and will always) apply: Know what data you have, know what it means, know what you can do with it and be sure to answer the original question. —Trevor Strome
Analytics Puts Physician Performance Under the Gun

Although physicians are highly driven and motivated people, they still require ongoing reports on their performance—or else they won’t know what to improve. Healthcare data analytics is increasingly being used as a way for physicians to receive feedback on their care.

Many hospitals still face problems with preventable blood clots—also known as venous thromboembolism. Between 350,000 and 650,000 people develop VTE a year, and as many as 200,000 deaths a year result from VTE. Blood clots are highly preventable if the proper medications are ordered on patients who have certain risk factors. In one large study, researchers looked at more than 70,000 patients at 358 hospitals and found that less than 60% of the surgical patients and less than 40% of the hospitalized medical patients received appropriate prophylaxis or preventative care advice. Only 50% of patients are getting enough prophylaxis as it’s defined by national guidelines.

Rating Performance
Why is this still happening if hospitals have EHRs and clinical-decision support tools at the point of care? The candid truth is that some physicians are performing more poorly than others when it comes to ordering proper blood clot prophylaxis regimens. Hospital administrators and physicians don’t like to point out physicians who are underperforming because that can make the hospital look bad. Or, in many cases, a reported physician may get angry, hostile and argumentative. In fact, some of the worst-performing physicians are the ones who have terrible bedside manners and poor interpersonal skills. They are the last ones whom you would want to inform of poor performance.
Healthcare data analytics provided on an ongoing basis can help physicians have a common denominator when they review their own performance. That common denominator is the aggregate performance of all their peers. This way, if 15 preventable blood clots are traced back to Doctor A, and only three clots are traced back to Doctor B, then we can run the data through some analytics to see if Doctor A is really doing a worse job preventing clots than Doctor B is. We would have to review variables such as patient risk factors and patient volume and complicating factors.

Ongoing data analytics could generate physician report cards. This would give the poor-performing physicians time to improve. They may need some continuing medication education to improve their knowledge about evidence-based blood clot prevention strategies. Or they may benefit from more reminders to prescribe prophylaxis in high-risk patients. They may need more clinical-decision support tools to help them assess the risk of blood clots in their patients. Maybe some of these physicians are not adopting their hospital’s risk-assessment protocol. Or maybe they are ignoring protocol because they think they know how to treat patients.

**CRITIQUING THE CAPTAIN**

Hospital leaders may need to do a better job at achieving physician buy-in on proper prophylaxis care strategies. Or perhaps hospitals need to do more to penalize physicians who are performing poorly and doing an unsatisfactory job prescribing prophylaxis to their patients. The data is there. Hospitals can identify those physicians. But providing negative feedback and constructive criticism to physicians can be challenging. It goes against the culture of medicine, where physicians traditionally view themselves as the captain of the ship when it comes to making treatment decisions about
their patients. Some physicians want to avoid the notion of “cookbook medicine,” which is primarily driven by algorithmic processes and automation. They want to rely on the traditional art of medicine and less on the evidence-based science of medicine.

To convince some of these physicians about their need to change their clinical behaviors, hospitals need to use more data analytics and present this in an ongoing fashion to their physicians. They need to do this in a way that fits the culture of their medical staff. They need support and buy-in from senior executive and medical staff leadership.

The practice of medicine is changing as healthcare data analytics becomes more closely integrated with clinical care delivery models. Some doctors do not like this fact, but others are embracing the change and looking forward to seeing more integration of data analytics into their clinical practices. —Joseph Kim
Cloud Storage Gives Patient Care a Lift

**Where data is** stored today is tied to the Office of the National Coordinator for Health IT and the Centers for Medicare and Medicaid Services. Both these organizations are coordinating the implementation of EHRs in hospitals and clinics, and to accomplish this, they have advised on the meaningful use of EHRs.

According to the two regulatory groups, one indication that an organization is using an EHR meaningfully is that it can exchange health information between hospitals and clinics—one of the greatest benefits of cloud storage.

The overall implied question framing this discussion can be answered by addressing the one thing every hospital should ask:

How will stored data be accessed? That is, what do hospitals need to know about public or hybrid cloud storage before they decide to use either option?

**The right choice is never easy**

The easy answer is that all hospitals should use the public cloud for storage of population health and well-being information. A more difficult issue surrounds what kind of data a hospital should contribute to public cloud storage. This question is harder—the answer must abate hospitals’ two concerns. The first is how a hospital can differentiate itself from others while maintaining its competitive edge. The second is how a hospital can retain its position in the industry while serving the greater good of the population.

A third, more difficult concern arises after these first two are addressed. It relates to hospitals’ need to store their differentiating operations data privately and store and report their detailed outcomes data publicly. When this detailed outcome data is massaged, and de-identified, it can be put into a public storage cloud and can be used for health information exchange.
A hospital’s detailed outcomes data is something else to consider. It needs consistent and constant data collection from automated inputs, with minimal human intervention. It also takes skilled hands to understand and make use of this data. Earlier, an indication was made that by answering the “where” question, other situations could arise that require more than simply providing cloud storage—and could require heavier cloud-computing tasks. Massaging stored patient data into detailed outcome data is one such situation for which hybrid cloud computing could be the answer.

**CLOUD CONSIDERATIONS**

Think in terms of a hospital locally differentiating itself from others for its skill in treating a particular ailment, say heart disease. Locally, this hospital is superior in producing successful patient outcomes for heart disease. Nationally or internationally, however, the same institution may be above average but not better than everyone else.

In these cases a hybrid cloud consisting of local, national and international heart centers is a viable solution, because this will enable sharing of detailed heart information from a variety of sources. If this virtual heart center also contains research work and data manipulation of successful and notable heart physicians and researchers, then a vast center for physician consultation exists and is as simple to use as merely logging in to the Internet site.

Every hospital should ask itself four main questions as it evaluates and decides to use cloud storage systems. These are the same questions asked for any research inquiry: who, what, where and how. In this case, these questions must be qualified: Who is your storage vendor, what is the nature of your data, where is that data currently stored, and how will people access it? The goal of these questions is to provide the hospital with details about its own cloud storage possibilities. It’s also very important information required to work with any vendor. It will greatly enhance any hospital-vendor relationship, and it will help any hospital position itself for any storage-related initiative. —Jon Gaasedelen
**TREVOR STROME**, M.S., P.M.P., is the founder of Health careAnalytics.info and the author of Healthcare Analytics for Quality and Performance Improvement. Email him at tstrome@wrha.mb.ca.

**JOSEPH KIM**, M.D., is president of MCM Education, which develops certified continuing medical education activities in joint sponsorship with accredited providers. Email him at mdjoekim@gmail.com.

**JON GAASEDELEN** is an independent IT consultant with more than 20 years of experience with information systems infrastructures. He has an undergraduate degree in economics and a master’s degree in health informatics, both from the University of Minnesota. To reach him, email editor@searchhealthit.com.