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Time to Use Big Data for Quality Improvement

Quality professionals have been told for years, regularly and with great enthusiasm, that they should be using “big data” to radically improve quality and improve outcomes, but many found that doing so was a challenge and didn’t live up to expectations. Now, however, it might finally be possible to truly use the wealth of data available to healthcare leaders for meaningful change.

The difference now is that the amount of data has greatly increased and it is much more accessible, say several experts. The wide scale adoption of the electronic health record (EHR) resulted in a rapid accumulation of more data and created an infrastructure that made it much easier to access in useful ways, says **Mark Wolff**, PhD, chief health analytics strategist with SAS, a data analytics firm based in Cary, NC.

“Over the years there have been

many pronouncements that not only technology, but also the amount of information available to that computational power, will finally create some dramatic paradigm shift,” Wolff says. “And that once that occurs, it will be truly transformative.”

Big data is different from the type of data routinely used in healthcare

because it involves extremely large data sets are analyzed to reveal patterns, trends, and associations. The idea of using big data for significant change

goes back as far as 1959, when the first paper on the use of big data was published, Wolff notes. Another prominent paper with the same declaration appears every 10 or 15 years, he says.

“So here we are in 2017 effectively saying the same thing. Computational power is not a limitation now so perhaps now the data are going to drive this revolution,” Wolff says.

“There are reasons now that this time

ONCE THAT OCCURS, IT WILL BE TRULY TRANSFORMATIVE.

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we probably will see a dramatic shift in outcomes analysis, quality, and the standardization of care as a prerequisite to delivering higher quality, lower cost care.”

Digital Data Makes a Difference

The first reason is the availability of the data in a digitized form, he explains. Healthcare providers have always had a great deal of information they could use, but that data usually was in the basement in manila folders with colored tags. Now that data is digitized, and there also is the ability to deconstruct data in medical imaging to data that can be analyzed. Mathematical matrices for imaging data is leading to potential advancements such as the ability to automate the diagnosis of lung cancer.

Combining that volume and type of data with the technological improvements for analyzing massive amounts of information creates a significant opportunity for healthcare quality improvement, Wolff says.

“We’ve never seen anything like this,” he says. “It really is quite dramatic.”

Vast amounts of healthcare data can transform population health analytics, Wolff says. Statistical sampling was developed because the technology did not exist to look at large amounts of data, he notes. The data had to be sampled to bring the volume down to a manageable size. Today, sampling is much less necessary, almost not at all. It is possible to look at the data from hundreds of millions of patients all at once in an analytic platform. *(For examples of how big data helped improve population health and reduce drug errors,*

see the stories later in this issue.)

“Without sampling, we have the power to identify small groups, outliers, unique events,” Wolff says. “Medicine is about looking for something that is different, a similarity among individuals, a genetic combination that is meaningful, behavior information. With massive data, I can go to the hospital and they can do patient matching, comparing my condition to hundreds of millions of individuals over time. You can identify the people who look most like me and then identify what was done and what the outcome was.”

That allows personalization of medicine that does not rely solely on genome sequencing or other complicated applications, he says. Some cancer researchers have even suggested that oncology is so complex that it is unethical to treat patients without computer algorithms.

“We’ve approached and surpassed the limit of human cognitive abilities to understand not only the volume of information available, but what is relevant and needs to be addressed,” Wolff says. “The complexity of the disease and the treatments, with different combinations producing different results for different cancers in different people, means that we have to use technology to deal with the information overload.”

Industry More Interested

Healthcare providers are looking more at how to use the data available to them, says **Anne McGeorge**, U.S. and global national managing partner of healthcare with the Chicago-based consulting firm Grant Thornton. The movement to a value-based payment system puts more

Big Data Can Address Population Health

Population health management and care coordination can benefit from the use of big data, including not only clinical records but also data indicating social determinants of health, says **Linda Lockwood**, managing director of the health solutions group for Computer Task Group, one of the largest IT staffing companies in the country, based in Buffalo, NY.

“Social determinants of health” is a term and concept that has been getting more attention lately, focusing on the idea that socioeconomic factors can play a significant role in an individual’s health and the outcomes of healthcare.

“Big data has a connection in driving that forward,” she says. “When we look at care coordination and empowering someone to be healthy, we have to understand more than the tests that were ordered and drugs prescribed. We have to understand where they live and what those environmental factors are that influence their health”

Zip code data, for instance is readily available and can provide insight into the social determinants of health, Lockwood says. That information can be helpful in identifying how many grocery stores or pharmacies are in the area, for instance, or the availability of public transportation.

“In one case with a community health center and medical home, we found there were no food resources except fast food and they had a high population of diabetics,” she says. “That told us we needed to offer alternatives and educate people about the importance of healthy eating. We ended up setting up a farmer’s market at the hospital and a clinic where patients could come in and get their A1c, meet in a group setting, prepare food with a nutritionist, and have lunch.”

The same community had few parks or exercise opportunities, partly because the neighborhood was dangerous and people were not comfortable exercising outdoors or going to a gym. The solution was organizing an exercise group that would meet regularly at a mall for exercise.

“When you start to think of non-healthcare data that influences how that patient is going to take care of themselves, big data becomes very important,” Lockwood says. “Merely assigning a care coordinator and calling them to remind them to check their blood pressure isn’t going to be enough to move the needle and improve those outcomes.” ■

SOURCE

- **Linda Lockwood**, Managing Director, Health Solutions Group, Computer Task Group, Buffalo, NY. Telephone: (716) 882-8000.

pressure on healthcare organizations to use available data to make good clinical decisions for population health, she says. In effect, she says, hospital leaders are learning how to make money by keeping their patients out of the hospital rather than by bringing them into the hospital.

“A big piece of that is the strategic use of data,” she says. “By being able to capture the data at least in their electronic record systems, they feel they can more effectively manage the health of their patients. Healthcare leaders are realizing this is an opportunity

and they are looking for ways to make it happen and move forward.”

EHR Offers Clues

McGeorge worked with one hospital that had 250,000 patients in its EHR database, and they know that within that group there are 50,000 smokers. They used that data to reach out to each individual and offer smoking cessation assistance and other information encouraging a healthy lifestyle. Many diseases and other issues can be tracked in the same way and individuals identified for intervention, she notes.

In comparison to other industries, the healthcare industry is lagging in making the most of big data, she says. The retail industry, for example, uses customer data to target individual customers with good results. She recalls one department store that identified customers buying pregnancy tests and offered those customers information on pregnancy care, and later diapers and other baby items. The same rationale could be used for identifying patients who are likely to follow a pattern and then respond to them at appropriate stages, she says.

“The healthcare industry has focused on providing good clinical care to their patients and they typically achieve that with high marks,” McGeorge says. “But sometimes the organization doesn’t see the analysis of big data as a clinical function or even a core function. By moving more toward analyzing big data, hospitals can evaluate how they’re doing in treating sick patients and in keeping well patients out of the hospital.”

Start with Understanding HER

Hospital leaders seeking to make

more use of big data should start with a deep dive into their EHR system, McGeorge says. Hospitals with an enterprise resource planning (ERP) system also will that to be a good source for data.

“The ones with a robust ERP system can actually do a deep dive into the analytics covering, for example, the cost of certain procedures, even to the cost of caring for that patient from the moment he or she walks in the door to the moment the patient is discharged. Knowing the fully loaded cost of taking care of a patient is a huge step being analyze profitable departments, procedures, and pharmaceutical protocols, which can change behaviors and create more efficiencies in how some of the clinical care is delivered.”

Hospitals also should look at the capabilities of their existing systems, she says. Many hospital leaders do not fully understand that their existing technology can do, sometimes if a big data effort would require a significant investment in more technology, she says. System interoperability also is important, she says.

Objective, Unbiased Analysis

New technology can make use of data that researchers never could analyze in large volumes, notes **Josh Bach**, managing director of the enterprise improvement group at Van Conway & Partners, a management consulting firm based in Birmingham, AL. He recently was involved with a project that used the IBM Watson machine to study information available from films of interviews with Parkinson’s patients.

“Utilizing and leveraging big data allowed us to feed into Watson all of the interviews and writing samples

Children’s Hospital Uses Big Data to Stop Overdose Errors

Phoenix Children’s hospital has used big data analysis to essentially eliminate overdose errors with its Pediatric Dose Range Checking System.

Dosing errors are a concern for pediatric facilities because patient weights vary dramatically, and most medication doses are based on weight. A dose that is appropriate for an adolescent would be an overdose for an infant, and in the reverse the adolescent would likely receive no benefit from the medication.

In addition, with premature babies and other small patients, even a slight deviation from the correct dose could be life threatening.

Chief Medical Information Officer Vinay Vaidya, MD, led a team that developed a dose ranging checking system intended to eliminate 100% of overdosing errors -- at the prescribing stage, before the error could affect the patient.

Big data was essential to finding the solution, according to a summary provided by the hospital. The team analyzed more than 750,000 prescription orders from Phoenix Children’s across an eight-year period, combining that information with drug dosage reference information. The analysis also factored in feedback from pharmacists and physicians to define thresholds for “very high” and “dangerously high” doses.

The extensive analysis prompted Phoenix Children’s to develop a two-tiered alert system within the hospital’s electronic health record (EHR) that uses the big data information to instantly assess the accuracy of a prescription to determine if it is within the acceptable range for that patient. A drug order that deviates by a relatively small amount returns a “soft stop,” that suggests double checking the order. An order that deviates significantly – such as when an adolescent dose is prescribed for an infant – will produce a “hard stop” that requires the prescriber to consult a pharmacist about amending the dosage before the order can be fulfilled.

The hospital has not had a dosing error reach the patient since the Pediatric Dose Range Checking System was introduced in 2011. In 90% of hard stops, the physician either reduces the dose to a safe level or determines that the order was erroneous and cancels the prescription.

In the first four months after going live, the system generated 11 hard stops for intravenous potassium, which can be lethal in overdoses. ■

to find to facial expressions, verbal expressions, hints or degradation in the handwriting, to earlier predict the disease,” Bach says. “The analysis also enabled us to monitor those with the potential for the disease and follow their progress for any similarity to the data from people who had Parkinson’s.”

Bach worked on a similar proj-

ect with a team of researchers and clinicians who were using big data to review all oncology pre- and post-marketing trials to see if Watson could glean better treatment algorithms that would have been free of the researcher bias that has plagued many studies in the past. The clear majority of cancer trials are on single drugs, but most treatment is ap-

proached with combination therapy.

Oncology with its regimented dosing schedules and comparatively immense data tracking is a more attractive target for cognitive computing, Bach notes. Unlike other areas of medicine, oncology is the most likely to have accurate inputs on dosing and compliance due to the life-threatening nature of the disease and high cost of the medication, he says.

[...You have cases in which the researcher has some sort of bias or a certain hypothesis about treatment or dosing and thus many times a well intentioned and well qualified group of people will come up with a conclusion that supports their pre-conceived bias.]

The big data analysis helped overcome biases that may have affected other assessments, he says.

“You’re not doing double-blind, placebo-controlled trials on cancer

patients because it’s unethical. And you have cases in which the researcher has some sort of bias or a certain hypothesis about treatment or dosing and thus many times a well intentioned and well qualified group of people will come up with a conclusion that supports their pre-conceived bias,” Bach says. “With the big data and the Watson computer, there is no preconceived bias. We’re able to

look at all research that has been published and digest in such a way that you’re going to get outputs suggesting certain treatment algorithms are going to be favorable, without the bias of a few key opinion leaders or research institutions that may have had a vested interest in one conclusion over another.”

Big data also can be influential with monitoring compliance and key performance indicators, says **David Kaufman**, JD, a partner in the Healthcare Practice Group with the law firm of Freeborn & Peters in Chicago.

“Quality through the lens of ef-

iciency, standardization and compliance can be enabled pro-actively to ensure efficiencies and make immediate improvements,” he says. “For example, quality KPIs [key performance indicators] can be launched via business rules or by a triggered alert to acquire data based on outliers or thresholds. If those specified KPIs are not met, it’s immediately reported, signaling where, when, and in some cases, why the threshold was violated.” ■

SOURCES

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- **Mark Wolff**, PhD, Chief Health Analytics Strategist, SAS, Cary, NC. Telephone: (919) 677-8000.

Hospitals Can Now Factor Socioeconomic Status into Readmissions

Hospitals have long complained that assessments of their readmission rates do not factor in the socioeconomic factors that can influence them, resulting in facilities serving the neediest patients taking a financial hit when they don’t meet national standards. That is about to change, with the introduction of a law that allows hospitals to factor in that information when determining

readmission rates.

Some hospital leaders will rejoice, but there is concern that the law will result in some facilities lowering the bar for acceptable readmission rates.

The change comes as a detail in the 994 pages of the 21st Century Cures Act, which was signed into law in December 2016. The law originated to address biomedical innovation but became a catch-all

for a variety of healthcare issues, including a provision that requires Medicare to account for patient backgrounds when determining financial penalties under the Hospital Readmissions Reduction Program. Hospitals are penalized if a patient returns to the hospital within 30 days after discharge for the same reason they were originally admitted.

Readmissions at hospitals serv-

ing a high proportion of disadvantaged patients can be higher because discharged patients have limited access to food, medication, and follow-up care. A rate higher than the national average results in CMS reducing Medicare reimbursement.

The new law will redistribute the penalties across a greater number of hospitals, says **Neil Smiley**, CEO at Loopback Analytics, a healthcare consulting group based in Dallas, TX. That means there will be winners and losers.

“Folks that thought they were in great shape and not subject to any readmission penalties are likely to have a rude awakening as risk gets redistributed from hospitals that have a high dual-eligible population to those that don’t,” Smiley says. “Those that have been really struggling with readmissions may be able to sit back and realize it’s no longer as much of a problem.”

Inner city hospitals and those with a high teaching component have been most unfairly affected the penalties, so they are likely to benefit the most. More affluent hospitals will find that their target for readmissions has suddenly been lowered, requiring steps to stay below the national average, he says.

“The law is revenue neutral, so it’s not like the penalties are lessened,” Smiley explains. “The amount of money CMS takes back is going to be the same. It’s just going to come from different players.”

Bar Could Be Lowered

There is some controversy over the law, with critics saying that reducing penalties to safety net hospitals with a disadvantaged population amounts to letting those hospitals meet a lower standard of care than

Readmission Figures Might Be Better Tied to Quality

Including socioeconomic factors with readmission rates will provide a more realistic picture of hospital quality, says **Sanjay Bhatia**, MD, FHM, CDIP, chief medical officer at Lower Bucks Hospital in Bristol, PA., and founding partner of First Docs/Mercer Bucks Medical.

“Patients do get readmitted. It’s just a fact of life, especially with patients living longer,” he says. “The illnesses that CMS is measuring, COPD and pneumonia, these are ailments of people that are older and the older patient is more likely to live in a disadvantaged area. Younger patients come more often from more affluent neighborhoods and they’re not as sick, and don’t go to the hospital as much.”

People from lower socioeconomic backgrounds are more likely to work past the typical retirement age, and they also go back to work faster, whether they are ready or not, because they cannot afford to lose pay or the job, Bhatia says. These patients also are more likely to be taking multiple.

“There are multiple publications showing that if you’re taking a slew of medications it’s almost impossible to take them correctly. And that’s for retired people,” he says. “Now imagine you’re elderly, still working, and taking all these medications at different times throughout the day and with different requirements. Those medications aren’t going to be taken accurately.”

Home care also is less reliable with impoverished patients because home care workers have difficulty catching them at home or reaching them by phone, Bhatia says, and in some cases the neighborhood is so dangerous that the workers won’t venture in.

“These patients need a lot of care and they are a lot of risk. It’s no surprise that they’re going to be readmitted more often,” Bhatia says. “So I think it’s right that there has to be some adjustment in the readmission penalties to account for this.”

Nevertheless, Bhatia says the ability to factor in socioeconomic factors will not change the essential fact that safety net hospitals are at a disadvantage when compared to other hospitals on objective metrics. The financial return, no matter how small, still can make a difference with hospitals that are already living on the edge.

“I think it will have a minimal to moderate impact, but some of these hospitals are looking at losses of one million, two million, three million dollars a month,” Bhatia says. “So if you cut the readmissions score down by even a point, that’s going to make a difference to them. There are still plenty of other changes that need to be made, but this is a step forward.” ■

SOURCE

- **Sanjay Bhatia**, MD, FHM, CDIP, Chief Medical Officer, Lower Bucks Hospital, Bristol, PA. Telephone: (215) 785-9200.

others, condemning that population to a lower quality of care than more affluent patients. There is a danger

of hospitals letting their readmissions efforts slip because the threat of penalty is not as much, Smiley says.

“One of the very perverse aspects of the readmission penalties is that they encourage hospital CFOs to shoot for mediocrity,” Smiley says. “If you’re any better at reducing readmissions it costs you money, and if you’re any worse it costs you money. Mediocrity is where you have optimal financial returns with these penalties. What you want to be is spot on average, no worse and no better, which seems kind of crazy to me.”

The effects of the law should be felt immediately as hospitals calculate readmissions and determine where they stand under the new law. Actual financial repercussions will take longer, as the readmissions program has a three-year tail for calculating averages.

“People will do their calculations and figure whether they’re still in the penalty soup or not,” Smiley says. “Those who have invested in trying to reduce readmissions may ask whether they need to double down, and others may ask if they can let off the pedal a little bit and reinvest

those resources somewhere else.”

Bundled payments would be a better alternative, encouraging quality without penalizing hospitals unfairly, says **Donald Fry**, MD, executive vice president for clinic outcomes management with MPA Healthcare Solutions in Chicago and adjunct professor of surgery at Northwestern University Feinberg School of Medicine. Fry notes that factors such as income levels, employment, geographic location from the index hospital, and a healthcare giver in the home of the patient need to be considered in the payment structure, and in the likelihood that patients will seek emergency department or readmission care.

Bundled Payment strategies can do this with appropriate databases and could eliminate the Medicare Hospital Readmissions Reduction Program in its entirety, Fry says.

Fry also notes that there can be a problem with defining safety net hospitals. Some facilities thought of as safety net hospitals have substantial financial reserves from

well insured patients, he says.

“Waiving the readmission reduction penalties based on the amount of unreimbursed care that some providers may be giving a pass to some very solvent and well to do facilities,” Fry says. “Medicare patients, even if they are going to safety net hospitals, are not the charity care patients that many of us have spent lifetimes taking care of. They are not the down and out, unemployed, indigent patients that have nothing else in the world. So when we look at waiving readmission penalties on well insured patients, I’m having a hard time understanding why that’s a good thing.” ■

SOURCES

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- **Neil Smiley**, CEO, Loopback Analytics, Dallas, TX. Telephone: (972) 480-3300.

Hopkins Command Center Improves Quality with Coordination

The Johns Hopkins Hospital in Baltimore, MD, is improving quality and patient safety with a state-of-the-art, advanced control center that coordinates care throughout the facility, bringing together many department representatives who can work efficiently with real-time data.

The Judy Reitz Capacity Command Center opened in February 2016 after Johns Hopkins leaders collaborated with GE Healthcare Partners (GE) to design and implement the center. Operating much as

the central monitoring and command control one might find in a military complex or a nuclear power plant, the command center combines the latest in systems engineering, predictive analytics and innovative problem-solving to address safety, volume, and the movement of patients in and out of the hospital

About 24 staff members from different departments work together in a single room filled with computer displays that show real-time and predictive information. They are empowered to act to prevent or

resolve bottlenecks, reduce patient wait time, coordinate services and reduce risk. A main wall of computer monitors provides situational awareness and can detect potential problems, automatically triggering the command center team to take immediate action.

The system receives about 500 messages per minute on a typical afternoon, from 14 different Johns Hopkins IT systems generating real-time data, says **James Scheulen**, PA, chief administrative officer in the Johns Hopkins De-

partment of Emergency Medicine and president of Johns Hopkins Emergency Medical Services,

“We came to the realization that the hospital was running constantly at a very high occupancy rate, and because of that our patients were facing more delays and we were not able to manage as many patients as we wanted to,” he says. “We had a problem with the number of patients who were waiting for an extended period in the emergency department before being admitted, and we had problems with our operative system getting people into patient beds, so we ended up cancelling procedures.”

The hospital also was not able to efficiently accept all the patient transfers from other hospitals. Prior to the command center, Johns Hopkins had a widely distributed system of control, rather than having key players together and others empowered to make decisions quickly.

“We had groups of people worked together every day, coordinating services and optimizing what we provide patients, but they were distributed throughout the institution,” he says. “They had archaic communication modes, and even the process of doing their basic, fundamental work took too long because they didn’t share systems and information, and they’re physically in different locations. The simple process of getting someone in the hospital was taking hours instead of minutes.”

Needed to Improve Efficiency

Expanding capacity was not a viable solution to those problems, so Johns Hopkins looked at ways to improve efficiency.

“Everything about operating this place is about how process works. If you’re trying to improve an operation with high utilization, you can either control the number of patients accessing your facility, improve the number of beds you have, and you can control the time they take in process,” Scheulen says. “We can’t address the first two more than we’re doing already, so we have to do is to manage our processes very efficiently so we don’t waste time.”

The Hopkins team began with a series of process improvement projects intended to identify the processes that most needed improvement and would have the most impact on overall hospital efficiency. A first project was looking at perinatal delays and how to reduce OR holds.

Like at most hospitals, physical space is in high demand at Johns Hopkins, so finding a place to put the command center was a priority. Fortunately, one of the people working on the project with Scheulen oversaw a space that had recently been vacated and she made it possible to put the command center there. It happens to be in the exact center of the facility.

“We could have made it work in

another location, but having it dead center in the middle of all hospital operations sends the right signal to people that this is an important function, and that its purpose is to bring all these different departments into the same room,” he says.

Real-time Information

Development and construction of the command center took 17 months, after more than a year of discussion, Scheulen says. Activating the command center did not require hiring any new staff; people from many departments were transferred to the command center to more effectively do the jobs they already were doing, Scheulen says. With the command center, up and running, Hopkins is beginning more cross training for the command center staff.

A key benefit of the Capacity Command Center is that it gives front-line managers real-time information about their work, so they don’t have to rely on old data, Scheulen says.

The command center replaces the traditional ways of doing many things in the hospital, such as using phones and email to assign beds, coordinate work between departments, and respond to problems, Scheulen says.

For instance, the technology in the Capacity Command Center keeps staff members informed 24/7

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about when there is an influx of patients coming into the hospital, which hospital units need additional staff members, the status of how many patients are being treated, the need for and availability of beds across the hospital, the highest-priority admissions and discharges, and other information essential for ensuring high-quality patient care.

Scheulen says there have many

[Johns Hopkins has seen 60% percent improvement in the ability to accept the transfer of patient with complex medical conditions from other hospitals around the region and country, and ambulance pickup times have improved significantly.]

measurable benefits from the command center: Johns Hopkins has seen 60% percent improvement in the ability to accept the transfer of patient with complex medical conditions from other hospitals around the region and country, and ambulance pickup times have improved significantly. A Johns

Hopkins' critical care team is now dispatched 63 minutes sooner to pick up patients from outside hospitals. In the emergency department (ED) a patient is assigned a bed 30% faster after a decision is made to admit him or her, and ED patients are also transferred 26% faster after they are assigned a bed.

Better coordination also helped reduce transfer delays from the operating room after a procedure by 70%. In addition, the number of patients discharged before noon rose by 21%.

The software in the command center draws on data from the different software systems in use throughout the facility, applying logic and thresholds established for the command center, and displays it for the staff to see in real time. Staff response to a flashing display signaling trouble in a unit is governed by established protocols, which may include dispatching additional resources and staff, halting further admissions, or organizing a huddle with key people to find a solution.

"A lot of times you might think

that the people involved should know what's happening and how to respond, but in many cases we get a trouble warning or signal that something is building up, and we realize it before the staff on the unit does," Scheulen says. "That's from the real time data and analytics, and it allows us to act on the problem and mitigate the issue immediately, and often before it even becomes a real issue." ■

SOURCES

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Major Culture Shift Improves Quality and Safety

Quality improvement leaders at Madison Memorial Hospital in Rexburg, ID, faced a problem familiar to their counterparts at hospitals across the country: they would identify opportunities for improvement and find evidence-based solutions, but then the effort would fall flat because there was no buy-in from others.

Director of Quality Improvement

Mikel Barr, RN, says it had become a pattern.

"We were getting frustrated because we would get calls from different areas of the hospital saying, 'we're having an issue here and need help with this process,' asking us to come in and fix it," Barr says. "We would research it and come up with this big solution, but when we tried to implement the solu-

tion we would get resistance and push back. There was no buy-in to what we were trying to do."

A major shift in attitude was needed, so the hospital launched the Cultural Revolution: A Three Phase Volume to Value Transformation. The project significantly changed how the hospital looked at quality and patient safety, says **Nolan Bybee**, RRT, director of risk

management and compliance.

A key part of the effort, Barr says, was for her and Bybee to acknowledge that it wasn't working for them to devise solutions and then deliver them to the people affected by the issue. Those people, the experts in whatever matter was being addressed, had to be an integral part of finding a solution so that it would be most effective and so they would support it.

Value Equation Created

Barr and Bybee built the effort on three methodologies: LEAN to eliminate waste; Six Sigma to reduce variation, and the PDSA model to facilitate rapid testing of models before implementing them.

[Changing the way people thought about quality improvement and their role in it was the underpinning of the whole project, he says.]

"We knew we could go out and teach these methodologies to people, but we wanted to keep them at the forefront of everything we were trying to do," Barr says. "We tried to focus our organization on using these methodologies for every improvement effort, whether it's a preventative action, a corrective action, or just working on an improvement project. At the beginning of 2016 we went to our board of directors and basically taught them how to hold us accountable for using these methodologies."

They also educated top management at the hospital, emphasizing what Barr and Bybee called their value equation: Value = Quality +

Service divided by Cost.

"Everything we do has to increase value, so we've taken that concept and applied to our process improvement and any project we do," Bybee says. "If it's going to be of value it has to increase quality and/or service a lot more than it increases cost. We know there are some things that will cost money, but the value and service improvement have to outweigh that or else there is no value."

Let Staff Make Changes

Another goal was to make managers the quality leader in their departments, which Bybee says was a major culture change. Changing the way people thought about quality improvement and their role

in it was the underpinning of the whole project, he says. Doing things, the way they had always done it was only going to produce the same disappointing results, Bybee says.

"That was a major culture change and took a lot of work," Bybee says. "We learned that the culture of an organization will always trump the strategy. We had to make our quality revolution big and bold, because with any revolution it must be out in front, public, and big. It can't be something you do in the background."

One part of that culture change was empowering people to act on improving quality rather than waiting for approval and orders from the

top. To that end, Barr and Bybee encouraged staff to "proceed until apprehended." Do what you think is best until someone tells you to stop.

"That was a big deal for us and I recommend it for any hospital," Barr says. "Once your front line people and everyone else in the organization has been trained to the value equation, you have to make sure you don't have too many layers getting in the way of them acting on what you've taught them. You want your front line staff to have the ability to make change happen."

Prior to the quality revolution, nothing could be changed without running the idea through top administrators, which was discouraging and demoralizing to staff members with good intentions, and it often resulted in the idea being lost in the bureaucracy or refused for a vague reason.

"If they're using our value equation, we want to trust our staff members and have them make that change without having to get a bunch of approvals and a stack of papers signed," Barr says. "It takes a lot of letting go and trusting people all the way down to the direct care staff."

Value Over Volume

The constant message to employees is that the hospital wants and will reward value over volume. As the culture shifted, Nolan and Bybee introduced strategies to improve quality and safety.

These are some of the initiatives:

- Training modules were

COMING IN FUTURE MONTHS

- Humana Streamlines Physician Metrics
- Linking Quality to Supply Chain
- Consolidating Units to Improve Care
- Reducing Press Ulcers

developed for employees and specific task groups throughout the organization.

- The hospital created an Employee Engagement Committee to break down silos and bring people from different departments together for social events.

- A team huddle now takes place every day at 8:32 a.m. and 8:32 p.m. – odd times chosen to make them stand out from other scheduled events.

- After the team huddles, there is a patient safety huddle that must be attended by a representative from every department, to discuss any potential or real safety issues. For example, the morning after a heavy snow the safety director might explain that work is ongoing to clear outside walkways and in the meantime, they should remind staff and visitors to use extra caution to avoid falls.

- The Lean A3 form was modified for use as a “value summary” to help track and record data related to

performance improvement, corrective actions and root cause analyses.

- A risk matrix was introduced to help employees decide the likelihood and consequence of an undesirable event and identify a risk score.

To keep everyone focused and sustain the effort, Madison Memorial also began tying staff pay increases to quality and safety outcomes. In addition to personal performance and other factors, every employee’s income is dependent on the hospital’s performance on quality and safety metrics.

“There’s not much more that pulls people into line than compensation,” Barr says. “It helps people understand the bigger picture of how quality and safety matter to an organization. Now if a patient falls, you can’t say it’s that department’s problem. It now impacts every single person in the organization.”

That idea met resistance at first, with people complaining that if they worked in accounting or IT they had no influence on quality and safety, Bybee notes. It took a change in

mindset for people to accept that everyone in the organization is responsible for its overall quality, he says.

“Don’t get discouraged. It’s easy for staff to dismiss your message as just the flavor of the day, and they wait for you to drop it so they can get back to the way they always did things,” Bybee says. “You have to keep the culture change going, keeping it out front and continuing to add pieces to it to make it more stable and effective. The staff will see that it makes a difference and that’s when they get on board.” ■

SOURCES

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CE QUESTIONS

1. According to Mark Wolff, PhD, why is big data more useful than in past years?

- a. Computational power has increased and electronic health records have created more data.
- b. Privacy restrictions have been minimized for big data analysis.
- c. More healthcare organizations are allowing access to their data.
- d. Healthcare organizations now have more effective strategies for implementing the lessons from big data analysis.

2. What change related to readmissions was included in the 21st Century Cures Act, which was signed into law in December 2016?

- a. Hospitals will no longer risk financial penalties related to their readmission rates.
- b. Socioeconomic factors will now be factored into readmission rates when determining potential reimbursement penalties.
- c. Socioeconomic factors will no longer be factored into readmission rates when determining potential reimbursement penalties.
- d. Hospitals can now

choose whether to include socioeconomic factors in their readmission rates.

3. How many new employees were hired to staff the command control center at The Johns Hopkins Hospital in Baltimore, MD?

- a. Three new staff to manage the department representatives.
- b. One new employee for each department involved.
- c. One new employee to serve as the command control center IT specialist.
- d. None.

4. At Madison Memorial Hospital in Rexburg, ID, what is the goal of the "proceed until apprehended" policy?

- a. Empowering front line staff to make changes without waiting for administrative approval.
- b. Discouraging staff from making changes without input from a department head.
- c. Reminding staff that they will be held responsible for negative consequences of a change.
- d. Documenting who made a change and why.